The woods of the United States

Charles Sprague Sargent, American Museum of ...

THE WOODS OF THE UNITED STATES.

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WOODS OF THE UNITED STATES.

WITH AN ACCOUNT OF

THEIR STRUCTURE, QUALITIES, AND USES.

WITH

Geographical and other Notes upon the Trees which produce them.

By C. S. Sargent.

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INTRODUCTION.

THE American Museum of Natural History is indebted to its enlightened and public-spirited President, Mr. MORRIS K. JESUP, for a magnificent collection of woods, which display, for the first time in a satisfactory manner, the forest wealth of the United States. The conception of this collection belongs to Mr. Jesup. The forests of the United States are not surpassed by those of any other country in the variety and value of the timbers which they produce. Many of these are little known or appreciated commercially; and it was the belief of the founder of this collection that the opportunity it would afford to engineers, architects, and mechanics to examine specimens of the material produced by the forests of the whole country would be of great and immediate practical utility to the community, and that the presence of such a collection in the Museum of Natural History would facilitate the scientific and industrial study of the Sylva of this country, and develop a popular interest in forests and forest science.

Mr. Jesup's collection is the outgrowth of an investigation of the forest wealth of this country commenced by me more than five years ago. The results of that investigation have been published in Vol. IX. of the final Reports of the Tenth Census, which this collection will serve to illustrate.

The trees of the United States are represented in the Museum by large and characteristic trunk specimens, arranged in the sequence of their botanical relationship. These specimens are cut in such a manner as to display the bark, and cross and longitudinal sections of the wood, both polished and in its natural condition. They are supplemented, in the case of trees of commercial importance,

by carefully selected planks, or burls, which often show better than logs the true industrial value of the wood.

Specimens of a few of the arborescent species of the United States have not yet been secured, and others are still in preparation. These will be added to the collection as rapidly as possible.

A series of life-size water-colors of the foliage, flowers, and fruit of each tree represented in the collection by a wood specimen is in course of preparation. They will be displayed with the collection as fast as completed. An herbarium of the trees of the United States, arranged by Mr. C. E. FAXON of the Arnold Arboretum, will afford special students of dendrology an opportunity of critically studying the collection.

The following catalogue of the trees of this country will serve as a guide to the collection; it is condensed from Vol. IX. of the Reports of the Tenth Census, from which are derived the tables relating to the physical properties of the woods of the United States. These tables have been prepared for this publication by Mr. S. P. SHARPLES, of Cambridge.

C. S. SARGENT.

ARNOLD ARBORETUM, BROOKLINE, MASS.,
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CATALOGUE OF FOREST TREES.

MAGNOLIACEÆ.

1. Magnolia grandiflora, L.

Big Laurel. Bull Bay.

Cape Fear River, North Carolina, south, near the coast, to Mosquito Inlet and Tampa Bay, Florida; along the coast of the Gulf States to southwestern Arkansas, and the valley of the Brazos River, Texas, extending north in the valley of the Mississippi River to latitude 32° 30′.

A magnificent evergreen tree, 18 to 27 metres in height, with a trunk 0.60 to 1.20 metres in diameter; reaching its greatest development on the "bluff" formations along the eastern bank of the Mississippi River from Vicksburg to Natchez, and in western Louisiana.

Wood heavy, hard, not strong, close-grained, compact, easily worked, satiny; medullary rays very numerous, thin; color creamy white or often light brown, the heavier sap-wood nearly white; little used except as fuel; suitable for interior finish, fine cabinet work, etc.

2. Magnolia glauca, L.

Sweet Bay. White Bay. Beaver Tree. White Laurel. Swamp Laurel.

Cape Ann, Massachusetts; New Jersey, southward, generally near the coast, to Bay Biscayne and Tampa Bay, Florida; westward through the valley of the Mississippi River south of latitude 35°, and the Gulf States to southwestern Arkansas and the valley of the Trinity River, Texas.

A tree 15 to 22 metres in height, with a trunk sometimes 1.20 metres in diameter, or toward its northern limits reduced to a low shrub; swamps or low wet woods, reaching its greatest development on the rich hummocks of the interior of the Florida peninsula, and along the low sandy banks of pine-barren streams in the Gulf States.

Wood light, soft, not strong, close-grained, compact; medullary rays very numerous, thin; color light brown tinged with red, the sap-wood

nearly white; in the Gulf States sometimes used in the manufacture of small wooden-ware.

The dried bark, especially of the root, of this species and of *M. acuminata* and *M. Umbrella* are included in the American *Materia Medica*, furnishing an aromatic tonic and stimulant used in intermittent and remittent fevers.

3. Magnolia acuminata, L.

Cucumber Tree. Mountain Magnolia.

Western New York to southern Illinois; southward along the Alleghany Mountains, and scattered through eastern and middle Kentucky and Tennessee, usually on Carboniferous deposits, to southern Alabama and northeastern Mississippi; and in northeastern, southern, and southwestern Arkansas.

A large tree, 20 to 30 metres in height, with a trunk 0.60 to 1.20 metres in diameter; rich woods, reaching its greatest development on the slopes of the southern Alleghany Mountains.

Wood durable, light, soft, not strong, close-grained, compact, satiny; medullary rays numerous, thin; color yellow-brown, the sap-wood lighter, often nearly white; used for pump-logs, water-troughs, flooring, cabinet-making, etc.

4. Magnolia cordata, Michx.

Cucumber Tree.

Southern Alleghany Mountain region, — Georgia to Winston County, Alabama.

A tree 22 to 24 metres in height, with a trunk sometimes 0.60 metre in diameter; low rich woods; very rare and local.

Wood light, soft, not strong, close-grained, compact; medullary rays very numerous, thin; color light brown streaked with yellow, the sap-wood light yellow.

5. Magnolia macrophylla, Michx.

Large-leaved Cucumber Tree.

Western North Carolina to southeastern Kentucky, southward to middle and western Florida and southern Alabama, extending west to the valley of Pearl River, Louisiana; and in central Arkansas.

A tree 6 to 18 metres in height, with a trunk rarely 0.60 metre in diameter; rich woods, reaching its greatest development in the limestone valleys of northern Alabama; rare and local.

Wood light, hard, not strong, close-grained, compact, satiny; medullary rays numerous, thin; color brown, the sap-wood light yellow.

6. Magnolia Umbrella, Lam.

Umbrella Tree. Elk-wood.

Southeastern Pennsylvania, southward along the Alleghany Mountains to central Alabama, westward through Kentucky and Tennessee to northeastern Mississippi; and in central and southwestern Arkansas.

A small tree, rarely exceeding 12 metres in height, with a trunk 0.10 to 0.40 metre in diameter; rich, shady hillsides; most common and reaching its greatest development along the western slopes of the southern Alleghany Mountains.

Wood light, soft, not strong, close-grained, compact; medullary rays very numerous, thin; color brown, the heavier sap-wood nearly white.

7. Magnolia Fraseri, Walt.

Long-leaved Cucumber Tree.

Alleghany Mountains, from Virginia southward to western Florida and southern Alabama, extending west to the valley of Pearl River, Mississippi.

A small tree, 8 to 12 metres in height, with a trunk 0.15 to 0.20 metre in diameter; rich woods.

Wood light, soft, not strong, close-grained, compact; medullary rays very numerous, thin; color brown, the sap-wood nearly white.

8. Liriodendron Tulipifera, L.

Tulip Tree. Yellow Poplar. White-wood.

Southwestern Vermont, through western New England, southward to northern Florida; west through New York, Ontario, and Michigan to Lake Michigan, south of latitude 43° 30′; and south to latitude 31° in the Gulf States east of the Mississippi River; extending west to southeastern Missouri and northeastern Arkansas.

A large and valuable tree, 30 to 60 metres in height, with a trunk 2 to 4 metres in diameter; rich woods and intervale lands, reaching its greatest development in the valley of the lower Wabash River and along the western slopes of the Alleghany Mountains in Tennessee and North Carolina.

Wood light, soft, not strong, brittle, very close straight-grained, compact, easily worked; medullary rays numerous, not prominent; color light yellow or brown, the thin sap-wood nearly white; largely manufactured into lumber, and used for construction, interior finish, shingles, in boat-building, and especially in the manufacture of wooden pumps, woodenware, etc.; varieties varying in color and grain are recognized.

Liriodendrin, a stimulant tonic, with diaphoretic properties, is obtained by macerating the inner bark, especially of the root.

ANONACEÆ.

9. Asimina triloba, Dunal.

Papaw. Custard Apple.

Western New York, Ontario, eastern and central Pennsylvania to southern Michigan, southern Iowa, and eastern Kansas; south to middle Florida and the valley of the Sabine River, Texas.

A small tree, sometimes 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter, or often reduced to a slender shrub; rich, rather low woods, reaching its greatest development in the lower Wabash valley and in the valley of the White River, Arkansas.

Wood very light, very soft and weak, coarse-grained, spongy, layers of annual growth clearly marked by several rows of large open ducts; color light yellow shaded with green, the sap-wood lighter; the large fruit sweet and edible.

10. Anona laurifolia, Dunal.

Pond Apple.

Semi-tropical Florida, — Cape Malabar to Bay Biscayne, west coast, Pease Creek to the Caloosa River; in the West Indies.

A small tree, sometimes 9 metres in height, with a trunk 0.30 metre in diameter, or toward its northern limits and on the west coast often reduced to a stout, wide-spreading shrub; common, and reaching its greatest development, within the United States, on the low islands and shores of the Everglades in the neighborhood of Bay Biscayne.

Wood light, soft, not strong, rather close-grained, compact, containing many scattered open ducts; color light brown streaked with yellow, the sap-wood lighter.

The large fruit scarcely edible.

CAPPARIDACEÆ.

11. Capparis Jamaicensis, Jacq.

Semi-tropical Florida, — Cape Canaveral to the southern keys; in the West Indies and southward to Brazil.

A small tree, sometimes 6 metres in height, with a trunk 0.15 metre in diameter, or reduced to a low shrub; common and reaching its greatest development, within the United States, on Upper Metacombe and Umbrella Keys.

Wood heavy, hard, close-grained, compact, satiny, containing many evenly distributed large open ducts; medullary rays numerous, obscure; color yellow tinged with red, the sap-wood lighter.

CANELLACEÆ.

12. Canella alba, Murr.

White-wood. Cinnamon Bark. Wild Cinnamon.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, often 10 metres in height, with a trunk 0.22 metre in diameter; not rare.

Wood very heavy, exceedingly hard, strong, close-grained, compact; medullary rays numerous, thin; color dark reddish-brown, the sap-wood light brown or yellow.

The pale inner bark furnishes an aromatic stimulant and tonic, occasionally employed in cases of debility of the digestive organs.

GUTTIFERÆ.

13. Clusia flava, L.

West Indies; Key West prior to 1840. Not rediscovered by the later explorers of the botany of semi-tropical Florida, and probably not now growing spontaneously within the limits of the United States.

Wood not examined.

TERNSTRŒMIACEÆ.

14. Gordonia Lasianthus, L.

Loblolly Bay. Tan Bay.

Southern Virginia, south, near the coast, to Cape Malabar, and Cape Romano, Florida, and along the Gulf coast to the valley of the Mississippi River.

A tree 15 to 24 metres in height, with a trunk often 0.45 to 0.50 metre in diameter; low, sandy swamps.

Wood light, soft, not strong, close-grained, compact, not durable; medullary rays numerous, thin; color light red, the sap-wood lighter; specific gravity, 0.4728; ash, 0.76; somewhat employed in cabinet-making.

15. Gordonia pubescens, L'Her.

Franklinia.

Near Fort Barrington, on the Altamaha River, Georgia.

A small tree, not rediscovered during the present century, and now only known through cultivated specimens.

Wood not examined.

STERCULIACEÆ.

16. Fremontia Californica, Torr.

Slippery Elm.

California, — valley of Pitt River, southward along the western foothills of the Sierra Nevada, and in the Coast Ranges from the Santa Lucia to the San Jacinto Mountains; rare at the north, most common and reaching its greatest development on the southern Sierras and the San Gabriel and San Bernardino Ranges.

A small tree, 6 to 10 metres in height, the short trunk often 0.30 to 0.45 metre in diameter, or more often a tall, much branched shrub; dry, gravelly soil.

Wood heavy, hard, very close-grained, compact, satiny, containing many groups of small ducts parallel to the thin, conspicuous medullary rays; layers of annual growth obscure; color dark brown tinged with red, the thick sap-wood lighter.

The mucilaginous inner bark used locally in poultices.

TILIACEÆ.

17. Tilia Americana, L.

Lime Tree. Basswood. American Linden. Lin. Bee Tree.

Northern New Brunswick, westward in British America to about the one hundred and second meridian, southward to Virginia and along the Alleghany Mountains to Georgia and southern Alabama; extending west, in the United States, to eastern Dakota, eastern Nebraska, eastern Kansas, the Indian Territory, and the valley of the San Antonio River, Texas.

A large tree, 20 to 24 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or, exceptionally, 30 to 45 metres in height, with a trunk 0.92 to 1.84 metres in diameter; common in all northern forests on rich soil; toward its western and southwestern limits only on bottom-lands. A variety (*T. Americana*, var. *pubescens*, Loud) with thinner leaves softly pubescent beneath occasionally occurs in swamps and low ground from North Carolina to western Florida, generally near the coast.

Wood light, soft, not strong, very close-grained, compact, easily worked; medullary rays numerous, rather obscure; color light brown, or often slightly tinged with red, the sap-wood hardly distinguishable; largely used in the manufacture of wooden-ware and cheap furniture, for the panels and bodies of carriages, the inner soles of shoes, in turnery, and the manufacture of paper pulp.

The inner bark, macerated, is sometimes manufactured into coarse cordage and matting; the flowers, rich in honey, are highly prized by apiarists.

18. Tilia heterophylla, Vent.

White Basswood. Wahoo.

Alleghany Mountains from Pennsylvania, southward to northern Alabama and Florida; west to middle Tennessee and Kentucky, southern Indiana, and southern and central Illinois.

A tree 15 to 20 metres in height, with a trunk 0.60 to 1.20 metres in diameter; rich woods and bottom-lands; most common and reaching its greatest development along the western slopes of the southern Alleghany Mountains and in middle Tennessee.

Wood light, soft, not strong, close-grained, compact, easily worked; medullary rays numerous, obscure; color light brown, the sap-wood hardly distinguishable; generally confounded with that of *Tilia Americana*, from which it scarcely differs.

The young branches are often fed to cattle in winter by farmers in the southern Alleghany Mountains.

MALPIGHIACEÆ.

19. Byrsonima lucida, HBK.

Tallow Berry. Glamberry.

Southern keys of semi-tropical Florida; through the West Indies.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.25 metre in diameter, or often shrubby and branching from the ground.

Wood light, soft, weak, close-grained, compact; medullary rays numerous, thin; color light red, the sap-wood a little lighter.

Fruit edible.

ZYGOPHYLLACEÆ.

20. Guaiacum sanctum, L.

Lignumvitæ.

Keys of semi-tropical Florida, not rare; in the Bahamas, St. Domingo, Cuba, Porto Rico, etc.

A low, gnarled tree, not exceeding, within the limits of the United States, 8 metres in height, with a trunk sometimes 0.30 metre in diameter.

Wood exceedingly heavy, very hard, strong, brittle, close-grained, compact, difficult to work, splitting irregularly, containing many evenly distributed resinous ducts; medullary rays numerous, obscure; color rich yellow-brown, varying in older specimens to almost black, the sap-wood light yellow; used in turnery and for the sheaves of ships' blocks, for which it is preferred to other woods.

Lignum Guaiaci, Guaiacum-wood, the heart of this and the allied *G. officinale*, formerly largely used in the treatment of syphilis, is now

only retained in the *Materia Medica* as an ingredient in the compound decoction of sarsaparilla.

Guaiac, the resinous gum obtained from these species, is a stimulating diaphoretic and alterative, or in large doses cathartic, and is employed in cases of chronic rheumatism, gout, etc.

21. Porliera angustifolia, Gray.

Western Texas, — valley of the Colorado River to the Rio Grande, extending west to the Rio Pecos; in northern Mexico.

A small tree, 8 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or toward its eastern, northern, and western limits reduced to a low shrub; reaching its greatest development, in the United States, on the hills bordering the valley of the Guadalupe River.

Wood exceedingly heavy, very hard, close-grained, compact, the open ducts smaller and less regularly distributed than in *Guaiacum;* medullary rays very thin, numerous; color rich dark brown, turning green with exposure, the sap-wood bright yellow; probably possessing medicinal properties similar to those of lignumvitæ.

RUTACEÆ.

22. Xanthoxylum Americanum, Mill.

Prickly Ash. Toothache Tree.

Eastern Massachusetts, west to northern Minnesota, eastern Nebraska, and eastern Kansas; south to the mountains of Virginia, and northern Missouri.

A small tree, not often 7 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or, reduced to a shrub, 1.50 to 1.80 metres in height; common, and reaching its greatest development in the region of the great lakes; rocky hillsides, or more often along streams and rich bottom-lands.

Wood light, soft, coarse-grained; medullary rays numerous, thin; color light brown, the sap-wood lighter.

The bark of *Xanthoxylum*, an active stimulant, is used in decoction to produce diaphoresis in cases of rheumatism, syphilis, etc., and as a popular remedy for toothache.

23. Xanthoxylum Clava-Herculis, L.

Toothache Tree. Prickly Ash. Sea Ash. Pepper-wood. Wild Orange.

Southern Virginia, southward near the coast to Bay Biscayne and Tampa Bay, Florida, westward through the Gulf States to northwestern Louisiana, southern Arkansas, and the valley of the Brazos River, Texas.

A small tree, rarely 12 to 14 metres in height, with a trunk 0.30 metre in diameter; usually along streams and low, rich bottom-lands, reaching

its greatest development in southern Arkansas, Louisiana, and eastern Texas. A shrubby, or on the coast arborescent, form of western Texas, with shorter ovate leaves, is var. *fruticosum*, Gray.

Wood light, hard, not strong, soft, coarse-grained, not durable, containing many scattered open ducts; medullary rays numerous, thin; color light brown, the sap-wood lighter.

24. Xanthoxylum Caribæum, Lam.

Satin-wood.

Keys of semi-tropical Florida; in the West Indies.

A small tree, 6 to 10 metres in height, with a trunk 0.30 to 0.40 metre in diameter; not common.

Wood very heavy, exceedingly hard, not strong, brittle, fine-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin, conspicuous; color light orange, the sap-wood lighter.

25. Xanthoxylum Pterota, HBK.

Wild Lime.

Semi-tropical Florida, — Mosquito Inlet to the southern keys, and on the west coast from about latitude 29° to Cape Sable; southwestern Texas; and southward through Mexico to Brazil.

A small tree, sometimes 8 metres in height, with a trunk rarely exceeding 0.15 metre in diameter, or often reduced to a slender shrub. In Florida common, and reaching its greatest development on the keys of the west coast; in Texas not common, but widely distributed as a small shrub, or, on the shores of Matagorda Bay, west of the Nueces River, and in the valley of the Rio Grande, a low tree.

Wood heavy, hard, close-grained, compact; medullary rays thin, numerous; color brown tinged with red, the sap-wood yellow.

26. Ptelea trifoliata, L.

Hop Tree. Shrubby Trefoil. Wafer Ash.

Banks of the Niagara River, and Pennsylvania southward to northern Florida, west to Minnesota and the Indian Territory; through western Texas to New Mexico; in northern Mexico.

A small tree, sometimes 4 to 6 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or more often reduced to a slender shrub; shady, rocky hillsides.

A variety with more or less pubescent leaves, not rare on the south Atlantic coast, and the common form of western Texas, is var. *mollis*, Torr. & Gray.

Wood heavy, hard, close-grained, compact, satiny, layers of annual growth clearly marked by two or three rows of open ducts; medullary rays few, thin; color yellow-brown, the sap-wood hardly distinguishable.

The bark of the root possesses tonic properties, and is employed by herbalists in the form of tinctures and fluid extracts in the treatment of dyspepsia, debility, etc.; the bitter fruit is occasionally used domestically as a substitute for hops.

27. Canotia holacantha, Torr.

Arizona, — White Mountain region, valley of the Gila River, valley of Bill Williams Fork.

A small tree, 6 to 8 metres in height, with a trunk sometimes 0.30 metre in diameter, or often a large shrub; dry, rocky hillsides.

Wood heavy, hard, very close-grained, compact, satiny; medullary rays thin, obscure; color light brown tinged with red, the sap-wood lighter brown.

SIMARUBEÆ.

28. Simaruba glauca, DC.

Paradise Tree.

Semi-tropical Florida, — Cape Canaveral to the southern keys; through the West Indies to Brazil.

A tree sometimes 15 metres in height, with a trunk 0.60 metre in diameter; within the United States not common, and reaching its greatest development on the shores of Bay Biscayne.

Wood light, soft, not strong, coarse-grained, containing many large scattered open ducts; medullary rays few, thin; color light brown, the sap-wood a little darker.

The bark of this species is occasionally used as a substitute for that of *S. officinalis*, DC., as an aromatic, bitter tonic.

BURSERACEÆ.

29. Bursera gummifera, Jacq.

Gum Elemi. Gumbo Limbo. West Indian Birch.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast Caloosa River to Caximbas Bay; in the West Indies.

A tree often 18 metres in height, with a trunk 0.50 to 0.70 metre in diameter; one of the largest and most common trees of southern Florida, of very rapid growth and decay.

Wood very light, exceedingly soft and weak, spongy, containing many scattered open ducts; medullary rays numerous, thin; color light brown or gray, quickly discoloring with decay.

The aromatic resin obtained from this species was formerly somewhat used in various forms, under the name of *Caranna*, as a remedy for gout; and in the West Indies is manufactured into a valuable varnish.

30. Amyris sylvatica, Jacq.

Torch-wood.

Semi-tropical Florida, — Mosquito Inlet to the southern keys; in the West Indies.

A small tree, sometimes 7 metres in height, with a trunk 0.20 to 0.25 metre in diameter; common.

Wood very heavy, exceedingly hard and strong, close-grained, compact, resinous, exceedingly durable, susceptible of a beautiful polish; medullary rays obscure; color light orange, the sap-wood lighter.

MELIACEÆ.

31. Swietenia Mahogoni, L.

Mahogany. Madeira.

Southern keys of semi-tropical Florida; rare; in the West Indies and Central America.

A large tree, on the Florida keys rarely exceeding 15 metres in height, with a trunk sometimes 0.90 metre in diameter.

Wood heavy, exceedingly hard, very strong, brittle, very close-grained, compact, very durable, susceptible of a high polish; medullary rays numerous, obscure; color rich reddish-brown, turning darker with age, the thin sap-wood yellow; varying greatly in quality in different regions; largely used and preferred to all other woods for cabinet-making of all sorts, interior finish, etc.; formerly somewhat employed in ship-building.

OLACINEÆ.

32. Ximenia Americana, L.

Wild Lime. Tallow Nut. Hog Plum. Mountain Plum.

Florida, — east coast Saint John's River to the southern keys, west coast Caloosa River to Caximbas Bay; through the West Indies to Brazil, and on the coast of the Indian Peninsula (introduced?).

A small, low, wide-spreading tree, rarely exceeding 4 metres in height, with a trunk 0.15 metre in diameter, or in pine-barren soil and toward its northern limits reduced to a low shrub; common and reaching its greatest development, in Florida on the west coast.

Wood very heavy, tough, hard, close-grained, compact, containing numerous regularly distributed open ducts; medullary rays few, thin; color brown tinged with red, the sap-wood lighter.

Hydrocyanic acid can be obtained from the edible plum-shaped fruit.

ILICINEÆ.

33. Ilex opaca, Ait.

American Holly.

Quincy, Massachusetts, southward, near the coast, to Mosquito Inlet and Charlotte Harbor, Florida, through the Gulf States to the valley of the Colorado River, Texas, and extending northward through the Mississippi Valley to Southern Indiana.

An evergreen tree, sometimes 15 metres in height, with a trunk 0.30 to 1.20 metres in diameter, or toward its northern limits reduced to a shrub; generally in low, rather moist soil; most common and reaching its greatest development in the rich bottom-lands of southern Arkansas and eastern Texas.

Wood light, soft, not strong, tough, rather hard, close-grained, very compact, easily worked; medullary rays numerous, inconspicuous; color nearly white, turning to light brown with exposure, the sap-wood still lighter; used and admirably adapted for cabinet work, interior finish, and turnery.

A bitter principle (*Ilicin*), common to other species of the genus, has been obtained from the fruit of this tree.

34. Ilex Dahoon, Walt.

Dahoon. Dahoon Holly.

Southern Virginia, southward near the coast to Mosquito Inlet and Tampa Bay, Florida, and west along the Gulf coast to the prairie region of western Louisiana.

A small tree, sometimes 8 metres in height, with a trunk from 0.20 to 0.30 metre in diameter; low, wet soil, or often in cypress swamps and ponds; not common, and running into numerous forms, — var. *angustifolia*, Torr. & Gray; var. *myrtifolia*, Chapm.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood nearly white.

35. Ilex Cassine, Walt.

Cassena. Yaupon. Yopon.

Southern Virginia, southward, near the coast, to Saint John's River and Cedar Keys, Florida, west along the Gulf coast to southern Arkansas, and the valley of the Colorado River, Texas.

A small tree, 6 to 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or more often a shrub, sending up many slender stems and forming dense thickets; sandy, moist soil, along ponds and streams; reaching its greatest development on the bottom-lands of eastern Texas.

Wood heavy, hard, close-grained, liable to check in drying; medullary rays numerous, conspicuous; color nearly white, becoming yellow with exposure, the sap-wood lighter.

The leaves possess powerful emetic properties.

36. Ilex decidua, Walt.

Southern Virginia, southward, through the middle districts, to western Florida; through the Gulf States to the valley of the Colorado River, Texas, and northward through the Mississippi Valley to southern Illinois.

A small tree, 8 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or in the Atlantic States a tall, straggling shrub; low, wet woods along streams, reaching its greatest development in the Iron Mountain region of Missouri, and in southern Arkansas.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin; color creamy-white, the sap-wood lighter.

CYRILLACEÆ.

37. Cyrilla racemiflora, L.

Iron-wood.

North Carolina, southward, near the coast, to middle Florida, and west, along the Gulf coast, to the valley of the Pearl River, Mississippi.

A small tree, sometimes 8 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a tall shrub, sending up many stems from the root; open swamps, low thickets, or pine-barren pond-holes.

Wood heavy, weak, hard, close-grained, compact; medullary rays thin, not conspicuous; color brown tinged with red, the sap-wood a little lighter.

38. Cliftonia ligustrina, Banks.

Titi. Iron-wood. Buckwheat Tree.

Valley of the Savannah River, Georgia, south to middle Florida, and west, along the Gulf coast, to the valley of the Pearl River, Louisiana.

A small tree, sometimes 12 metres in height, with a trunk 0.30 to 0.40 metre in diameter, or toward its southern limits in Florida reduced to a shrub; margins of pine-barren ponds and streams.

Wood heavy, soft, not strong, close-grained, compact; medullary rays numerous, thin; color brown tinged with red, the sap-wood lighter; largely used as fuel, burning with a clear flame.

CELASTRACEÆ.

39. Euonymus atropurpureus, Jacq.

Burning Bush. Wahoo. Spindle Tree. Arrow-wood.

Western New York, west to the valley of the Missouri River, Montana, southward to northern Florida, southern Arkansas, and eastern Kansas.

A small tree, rarely 6 to 8 metres in height, with a trunk 0.15 metre in diameter, or more often a shrub 2 to 3 metres in height; low, rich woods, reaching its greatest development west of the Mississippi River.

Wood heavy, very close-grained, liable to check badly in seasoning; medullary rays hardly distinguishable; color white tinged with orange.

Wahoo bark, a mild but uncertain purgative, is used by herbalists in the form of decoctions, tinctures, fluid extracts, etc.

40. Myginda pallens, Smith.

Upper Metacombe Key, Florida; in the West Indies.

A small tree, rarely exceeding 4 metres in height, with a trunk 0.15 metre in diameter.

Wood very heavy, hard, very close-grained, compact, satiny; layers of annual growth and numerous medullary rays hardly distinguishable; color dark brown or nearly black, the thick sap-wood lighter brown tinged with red.

41. Schæfferia frutescens, Jacq.

Yellowwood. Box-wood.

Semi-tropical Florida, — southern keys from Metacombe Key eastward, Caloosa River, and sparingly on the Reef Keys; in the West Indies.

A small tree, occasionally 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, generally hollow and defective.

Wood heavy, hard, close-grained, compact, susceptible of a high polish; medullary rays numerous, obscure; color light bright yellow, the sap-wood a little lighter.

RHAMNACEÆ.

42. Reynosia latifolia, Griseb.

Red Iron-wood. Darling Plum.

Semi-tropical Florida, — southern keys to Bay Biscayne; in the West Indies.

A small tree, sometimes 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter.

Wood heavy, exceedingly hard, strong, close-grained, compact; medullary rays numerous, thin; color rich dark brown, the sap-wood light brown.

The fruit edible and of agreeable flavor.

43. Condalia ferrea, Griseb.

Black Iron-wood.

Semi-tropical Florida, — Cape Canaveral to Bay Biscayne, and on the southern keys; in the West Indies.

A small tree, sometimes 11 metres in height, with a trunk 0.25 to 0.38 metre in diameter, generally hollow and defective; common.

Wood exceedingly heavy and hard, strong, brittle, close-grained, compact, difficult to work; remarkable for the large percentage of ash; medullary rays very numerous, thin; color rich orange-brown, the sap-wood lighter.

44. Condalia obovata, Hook.

Blue-wood. Logwood. Purple Haw.

Eastern and southwestern Texas, westward through southern New Mexico to southern Arizona; probably extending into northern Mexico.

A small tree, 6 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a low, much branched shrub; reaching its greatest development along the streams of eastern Texas; one of the common "chaparral" plants of western Texas, here forming dense, impenetrable thickets.

Wood very heavy, hard, close-grained, liable to check in seasoning, containing many groups of large irregularly arranged open ducts; medullary rays numerous, obscure; color light red, the sap-wood light yellow.

45. Rhamnus Caroliniana, Walt.

Indian Cherry.

Long Island, New York, west along the valley of the Ohio River to southern Illinois, Missouri south of the Meramec River, eastern Kansas, and the Indian Territory, south to northern Florida, and through the Gulf States to eastern Texas.

A small tree, 6 to 10 metres in height, with a trunk 0.20 to 0.30 metre in diameter, or in the Atlantic States generally a tall shrub; rich woods along streams and bottom-lands; reaching its greatest development in southern Arkansas and eastern Texas.

Wood light, hard, not strong, coarse-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood lighter.

The fruit sweet and edible.

46. Rhamnus Californica, Eschsch.

California, west of the Sierra Nevadas, from the valley of the upper Sacramento River southward to Santa Barbara and Fort Tejon.

A small tree, rarely 7 to 9 metres in height, with a trunk 0.30 to 0.37 metre in diameter, or commonly a shrub, along the sea-coast and at high elevations, often prostrate; common and reaching its greatest development in the valleys of the Santa Cruz Mountains. A low shrubby form, densely white-tomentose, especially on the under side of the leaves, of southern California, Arizona, and New Mexico, is var. *tomentella*, Brewer & Watson.

Wood light, soft, rather coarse-grained, checking in drying; layers of annual growth marked by many rows of open ducts; medullary rays narrow, obscure; color brown or light yellow, the sap-wood lighter.

47. Rhamnus Purshiana, DC.

Bearberry. Bear-wood. Shittim-wood.

Puget Sound, east along the mountain ranges of northern Washington to the Bitter Root Mountains, Idaho, and the shores of Flathead Lake, Montana; southward through western Washington, Oregon, and northern California, west of the Sierra Nevada Mountains.

A small tree, often 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter; depressions and on the sides and bottoms of cañons in the coniferous forests; reaching its greatest development along the western slope of the Coast Range of southern Oregon.

Wood light, very hard, not strong, close-grained, compact, satiny; medullary rays numerous, thin; color light brown tinged with yellow, the sap-wood somewhat lighter.

The bark, like that of other species of the genus, possesses powerful cathartic properties, and, under the name of *Cascara sagrada*, has been introduced into commerce by herbalists in the form of fluid extracts and tinctures.

48. Ceanothus thyrsiflorus, Eschsch.

Blue Myrtle.

California, — Coast Ranges, from Mendocino County south to the valley of the San Luis Rey River.

A small tree, 8 to 10 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or toward the southern limits reduced to a low shrub; common and reaching its greatest development in the *Sequoia* forests near Santa Cruz Bay.

Wood light, soft, close-grained, compact; medullary rays very obscure; color light brown, the sap-wood darker.

The bark of the root may be expected to possess similar astringent properties to that of the shrubby *C. Americana*, used with advantage in cases of diarrhœa and dysentery, and as a domestic remedy in the treatment of troubles of the throat.

49. Colubrina reclinata, Brong.

Naked Wood.

Southern keys of semi-tropical Florida; in the West Indies.

One of the largest trees of the region, deciduous, 12 to 18 metres in height, with a trunk 0.60 to 1.25 metres in diameter; reaching its greatest development, within the United States, on Umbrella Key, here forming a dense forest; not common.

Wood heavy, hard, very strong, brittle, close-grained, compact, satiny, susceptible of a good polish, containing many small open ducts; medullary rays numerous, thin; color dark brown tinged with yellow, the sap-wood light yellow.

SAPINDACEÆ.

50. Æsculus glabra, Willd.

Ohio Buckeye. Fetid Buckeye.

Western slopes of the Alleghany Mountains from Pennsylvania to northern Alabama, and westward through southern Michigan (rare) to southern Iowa, eastern Kansas, and the Indian Territory.

A small tree, 8 to 15 metres in height, with a trunk 0.30 to 0.60 metre in diameter; rich soil along streams and bottom-lands; reaching its greatest development in the high valleys of the southern Alleghany Mountains.

Wood light, soft, not strong, close-grained, compact, difficult to split, often blemished by dark lines of decay; medullary rays obscure; color white, the sap-wood a little darker; largely used, in common with that of the other species of the genus, in the manufacture of wooden-ware, artificial limbs, paper pulp, wooden hats, less commonly for the bearings of shafting and machinery, and occasionally manufactured into lumber.

The bark of the allied old-world species *Æ. Hippocastanum* has been found efficacious as a substitute for *cinchona* bark in the treatment of intermittent fevers, and similar properties may be looked for in the bark of the North American species of this genus.

51. Æsculus flava, Ait.

Sweet Buckeye.

Alleghany Mountains from Pennsylvania to northern Georgia and Alabama, west to southern Iowa, the Indian Territory, and the valley of the Brazos River, Texas.

A tree 18 to 28 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or toward its southwestern limits reduced to a shrub; rich woods and borders of streams; reaching its greatest development on the slopes of the Alleghany Mountains of North Carolina and Tennessee.

A variety with purple or flesh-colored flowers, the leaflets pubescent beneath, is var. *purpurascens*, Gray.

Wood light, soft, close-grained, compact, difficult to split; medullary rays numerous, obscure; color creamy-white, the sap-wood hardly distinguishable.

52. Æsculus Californica, Nutt.

California Buckeye.

California, — valley of the upper Sacramento River and Mendocino County, southward in the Coast Ranges to San Luis Obispo, and along the western foot-hills of the Sierra Nevada Mountains.

A low, widely branching tree, 8 to 12 metres in height, with a short trunk 0.60 to 0.90 metre in diameter, often greatly expanded at the base, or more often a much-branched shrub from 3 to 5 metres in height; borders of streams, reaching its greatest development in the cañons of the Coast Ranges north of San Francisco Bay.

Wood light, soft, not strong, very close-grained, compact; medullary rays numerous, obscure; color white slightly tinged with yellow, the sap-wood hardly distinguishable.

53. Ungnadia speciosa, Endl.

Spanish Buckeye.

Valley of the Trinity River, Texas, to the cañons of the Organ Mountains, New Mexico; and southward into Mexico.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or towards its eastern and western limits reduced to a low shrub; common west of the Colorado River, on bottoms and rich hillsides, and reaching its greatest development in the valley of the Guadalupe River, between New Braunfels and the coast.

Wood heavy, soft, not strong, close-grained, compact, satiny, containing numerous evenly distributed open ducts; medullary rays numerous, inconspicuous; color red tinged with brown, the sap-wood lighter.

54. Sapindus marginatus, Willd.

Wild China. Soapberry.

Atlantic coast, — Savannah River to the Saint John's River, Florida; Cedar Keys; valley of the Washita River, Arkansas, through western Louisiana, and Texas to the mountain valleys of southern New Mexico and Arizona, and southward into Mexico; in the West Indies.

A tree on the Atlantic coast, sometimes 15 to 18 metres in height, with a trunk rarely 0.60 metre in diameter, west of the Colorado River much smaller, rarely 9 metres in height; borders of streams or toward the western limits of its distribution, only in mountain valleys; reaching its greatest development on the bottom-lands of eastern Texas.

Wood heavy, strong, hard, close-grained, compact, easily split into thin strips; layers of annual growth clearly marked by several rows of large open ducts; medullary rays thin, obscure; color light brown tinged with yellow, the sap-wood lighter; largely used in Texas in the manufacture of cotton-baskets, and in New Mexico for the frames of pack-saddles.

55. Sapindus Saponaria, L.

Soapberry.

Semi-tropical Florida, — Bay Biscayne to Caximbas Bay; in the West Indies.

A small tree, 6 to 10 metres in height, with a trunk sometimes 0.38 metre in diameter; common on Cape Sable, and reaching its greatest development, within the United States, on the Thousand Islands and along the shores of Caximbas Bay.

Wood heavy, rather hard, close-grained, compact; medullary rays numerous, thin; color light brown tinged with yellow, the sap-wood yellow.

The fruit and roots rich in *saponin*, and used in the West Indies as a substitute for soap; the round black seeds for beads, buttons, and small ornaments.

56. Hypelate paniculata, Cambess.

Ink-wood. Iron-wood.

Semi-tropical Florida, — east coast from Mosquito Inlet to the southern keys; in the West Indies.

A tree often 12 metres in height, with a trunk 0.45 metre in diameter.

Wood very heavy, exceedingly hard, very strong, close-grained, susceptible of a good polish, checking in drying; medullary rays obscure; color bright reddish brown, the sap-wood lighter; used in ship-building, for the handles of tools, and wharf piles; resisting the attacks of the *Teredo*.

57. Hypelate trifoliata, Sw.

White Iron-wood.

Southern keys of semi-tropical Florida; in the West Indies.

A tree sometimes 12 metres in height, with a trunk 0.45 to 0.60 metre in diameter; not common.

Wood very heavy, hard, close-grained, compact, susceptible of a fine polish, durable in contact with the soil; medullary rays thin, obscure; color rich light brown, the sap-wood darker; used in ship-building, for the handles of tools, posts, etc.

58. Acer Pennsylvanicum, L.

Striped Maple. Moose-wood. Striped Dogwood. Goose-foot Maple. Whistle-wood.

Valley of the Saint Lawrence River to the northern shores of Lake Ontario, and the islands of Lake Huron, south through the north Atlantic States, and along the Alleghany Mountains to northern Georgia; west through the lake region to northeastern Minnesota.

A small tree, 6 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter; cool ravines and mountain sides.

Wood light, soft, close-grained, compact, satiny; medullary rays numerous, thin; color light brown, the sap-wood lighter.

59. Acer spicatum, Lam.

Mountain Maple.

Valley of the Saint Lawrence River, west along the northern shores of the great lakes to northern Minnesota and the Saskatchewan region, south through the northern States and along the Alleghany Mountains to northern Georgia.

A small tree, sometimes 8 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a tall shrub; cool woods and mountain ravines; reaching its greatest development on the western slopes of the Alleghany Mountains of North Carolina and Tennessee.

Wood light, soft, close-grained, compact; medullary rays inconspicuous; color light brown tinged with red, the sap-wood lighter.

60. Acer macrophyllum, Pursh.

Broad-leaved Maple.

Coast of Alaska, from latitude 55° south along the islands and coast of British Columbia, through western Washington and Oregon, and along the California Coast Ranges and western slopes of the Sierra Nevada to the San Bernardino Mountains and Hot Spring Valley, San Diego County; not found above 4,000 feet altitude.

A tree 24 to 30 metres in height, with a trunk 1.20 to 1.50 metres in diameter; borders of streams; reaching its greatest development on the rich bottom-lands of the Coquille and other rivers of southern Oregon.

Wood light, soft, not strong, close-grained, compact, easily worked, susceptible of a good polish; medullary rays numerous, thin; color rich light brown tinged with red, the sap-wood lighter, often nearly white; largely used in Oregon in the manufacture of furniture, for axe and broom handles, frames of snow-shoes, etc.; specimens with the grain beautifully curled and contorted are common.

61. Acer circinatum, Pursh.

Vine Maple.

Valley of the Fraser River and probably farther north in British Columbia, southward through Washington and Oregon, west of the Cascade Mountains to the Mount Shasta region of northern California; rarely found above 4,000 feet altitude.

A small tree, sometimes 8 to 12 metres in height, with a trunk 0.20 to 0.30 metre in diameter; borders of streams; the stems often prostrate and forming dense, impenetrable thickets.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, thin; color light brown or often nearly white; the sap-wood lighter; specific gravity, 0.6660; ash, 0.39; used as fuel, by lumbermen for axe and shovel handles, and by the coast Indians for the bows of fishing-nets.

62. Acer glabrum, Torr.

Dwarf Maple.

Valley of the Fraser River and probably farther north in British Columbia, south through Washington, Oregon, and along the Sierra Nevada Mountains of California to the Yosemite Valley; east along the mountain ranges of Idaho and Montana to the eastern base of the Rocky Mountains, south through Colorado and Utah; in the east Humboldt Range, Nevada, and in the mountain ranges of western New Mexico and eastern Arizona.

A small tree, 8 to 12 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often reduced to a low shrub 1 to 2 metres in height; borders of streams, reaching its greatest development in the mountain cañons of western New Mexico and eastern Arizona.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin; color light brown, or often nearly white, the sap-wood lighter.

63. Acer grandidentatum, Nutt.

Western Montana, cañons of the Wahsatch Mountains, Utah, and south through eastern Arizona to southwestern New Mexico; and in Coahuila.

A small tree, rarely exceeding 10 metres in height, with a trunk 0.20 to 0.25 metre in diameter; borders of streams; not common.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin, distinct; color light brown, or often nearly white.

64. Acer saccharinum, Wang.

Sugar Maple. Sugar Tree. Hard Maple.

Southern Newfoundland, valleys of the Saint Lawrence and Saguenay Rivers, shores of Lake Saint John, west along the northern shores of the

great lakes to Lake of the Woods; south through the northern States and along the Alleghany Mountains to northern Alabama and western Florida; west to Minnesota, eastern Nebraska, eastern Kansas, and eastern Texas.

A tree of great economic value, 24 to 36 metres in height, with a trunk 0.60 to 1.20 metres in diameter, or towards its southwestern limits greatly reduced in size; rich upland woods; often forming extensive forests, and reaching its greatest development in the region of the great lakes. A form with more widely lobed leaves, often downy on the lower side, common along the borders of streams and on bottom-lands from western Vermont to southern Missouri, extending south to northern Alabama and southwestern Arkansas, is var. *nigrum*, Gray.

Wood heavy, hard, strong, tough, close-grained, compact, susceptible of a good polish; medullary rays numerous, thin; color light brown tinged with red, the sap-wood lighter; largely used in the manufacture of furniture, shoe lasts and pegs, saddle-trees, in turnery, for interior finish and flooring; in ship-building for keels, keelsons, shoes, etc., and furnishing valuable fuel; "curled" maple and "bird's-eye" maple, accidental forms in which the grain is beautifully curled and contorted, are common and highly prized in cabinet-making.

Maple sugar is principally made from this species; the ashes of the wood, rich in alkali, yield large quantities of potash.

65. Acer dasycarpum, Ehrh.

Soft Maple. White Maple. Silver Maple.

Valley of the Saint John River, New Brunswick, to southern Ontario, south to western Florida, west to eastern Dakota, eastern Nebraska, the valley of the Blue River, Kansas, and the Indian Territory.

A large tree, 18 to 30 or, exceptionally, 36 metres in height, with a trunk 1.20 to 1.80 metres in diameter, borders of streams and intervales, in rich soil; most common west of the Alleghany Mountains, and reaching its greatest development in the basin of the lower Ohio River.

Wood light, hard, strong, brittle, close-grained, compact, easily worked; medullary rays numerous, thin; somewhat used in the manufacture of cheap furniture, for flooring, etc. Maple sugar is occasionally made from this species.

66. Acer rubrum, L.

Red Maple. Swamp Maple. Soft Maple. Water Maple.

New Brunswick, Quebec, and Ontario south of latitude 49°, north and west to the Lake of the Woods, south to Indian and Caloosa Rivers, Florida; west to eastern Dakota, eastern Nebraska, the Indian Territory, and the valley of the Trinity River, Texas.

A large tree, 20 to 30 or, exceptionally, 32 metres in height, with a trunk 0.90 to 1.50 metres in diameter; borders of streams and low, wet

swamps, reaching its greatest development in the valleys of the lower Wabash and Yazoo Rivers. A form common in southern Arkansas, eastern Texas, western Louisiana, and sparingly through the Gulf States to southern Georgia, and well characterized by its obovate or truncate leaves, densely covered, as well as the petioles and young shoots, with a thick white tomentum, is var. *Drummondii*, Sargent.

Wood heavy, hard, not strong, close-grained, compact, easily worked; medullary rays numerous, obscure; color brown, often tinged with red, the sap-wood lighter; largely used in cabinet-making, turnery, and for wooden-ware, gunstocks, etc.

67. Negundo aceroides, Mœnch.

Box Elder. Ash-leaved Maple.

Shores of the Winooski River and Lake Champlain, Vermont, near Ithaca, New York, eastern Pennsylvania, and south to Hernando County, Florida; northwest through the lake region of the United States and Manitoba to Lake Winnipeg, and along the southern branch of the Saskatchewan to the eastern base of the Rocky Mountains; west, in the United States, to the eastern slopes of the Rocky Mountains of Montana, and the Wahsatch Mountains, Utah; southwest through the basin of the Mississippi River, western Texas, and New Mexico to eastern Arizona; and southward into Mexico.

A tree 15 to 22 metres in height, with a trunk 0.60 to 0.90 metre, or, exceptionally, 1.20 metres in diameter; moist soil, borders of streams, etc.; in the Rocky Mountain region in high valleys, between 5,000 and 6,000 feet elevation; one of the most widely distributed trees of the American forest, reaching its greatest development in the valleys of the Wabash and Cumberland Rivers.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color creamy-white, the sap-wood hardly distinguishable; occasionally used in the interior finish of houses, for wooden-ware, cooperage, and paper-pulp.

Small quantities of maple sugar are sometimes obtained from this species.

68. Negundo Californicum, Torr. & Gray.

Box Elder.

California, — valley of the lower Sacramento River, southward in the interior valleys of the Coast Ranges to the western slopes of the San Bernardino Mountains.

A small tree, 6 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter; borders of streams.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color nearly white, or slightly tinged with yellow; occasionally used in the manufacture of cheap furniture.

ANACARDIACEÆ.

69. Rhus cotinoides, Nutt.

Chittam-wood.

Alabama, — southern slopes of the Cumberland Mountains, north of the Tennessee River; and doubtfully reported north of the Alabama line, in Tennessee. Indian Territory, rocky banks of the Grand River (*Nuttall*).

In Alabama, a small wide-branching tree, 9 to 10 metres in height, with a trunk sometimes 0.30 metre in diameter, on limestone benches between 700 and 900 feet elevation, in dense forests of oak, ash, maple, etc.; local and very rare; not rediscovered in Arkansas or the Indian Territory; in Alabama nearly exterminated.

Wood light, soft, rather coarse-grained, checking badly in drying, very durable in contact with the soil; layers of annual growth marked by several rows of large open ducts; medullary rays numerous, very obscure; color bright, clear, rich orange, the thin sap-wood nearly white; largely used locally for fencing, and yielding a clear orange dye.

70. Rhus typhina, L.

Staghorn Sumach.

New Brunswick, west through the valley of the Saint Lawrence River to southern Ontario and Minnesota, south through the northern States and along the Alleghany Mountains to northern Georgia, central Alabama and Mississippi.

A small tree, rarely 9 metres in height, with a trunk 0.15 to 0.30 metre in diameter, or often a shrub; dry hillsides, or often along streams in sandy, moist soil.

Wood light, brittle, soft, coarse-grained, compact, satiny, taking a good polish; layers of annual growth clearly marked by four to six rows of large open ducts; medullary rays numerous, obscure; color yellow streaked with green, the sap-wood nearly white; occasionally used for inlaying cabinet work.

Bark and leaves, astringent, and rich in tannin, are somewhat used locally as a dye and in dressing skins.

71. Rhus copallina, L.

Dwarf Sumach.

Northern New England, south to Manatee and Caximbas Bay, Florida, west to Missouri, Arkansas, and the valley of the San Antonio River, Texas.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or at the north a low shrub 1 to 2 metres in height; dry hills

and ridges; reaching its greatest development in southern Arkansas and eastern Texas; running into various forms (var. *lanceolata*, Gray; var. *leucantha*, DC.).

Wood light, soft, not strong, coarse-grained, compact, satiny, susceptible of a good polish; layers of annual growth clearly marked by several rows of large open ducts; medullary rays thin, not prominent; color light brown, streaked with green, or often tinged with red; the sap-wood lighter.

Leaves and bark astringent, rich in tannin; the leaves largely collected, principally in Maryland, Virginia, West Virginia, and Tennessee, and ground for tanning and dyeing.

72. Rhus venenata, DC.

Poison Sumach. Poison Elder.

Northern New England, south to northern Georgia, Alabama, and western Louisiana, west to northern Minnesota, Missouri, and Arkansas.

A small tree, 6 to 8 metres in height, with a trunk sometimes 0.15 to 0.20 metre in diameter, or more often a tall shrub; low, wet swamps, or more rarely on higher ground.

Wood light, soft, coarse-grained, moderately compact; layers of annual growth clearly marked by three or four rows of large open ducts; medullary rays thin, very obscure; color light yellow streaked with brown, the sap-wood lighter.

The whole plant, as well as the allied *R. Toxicodendron*, is exceedingly poisonous to most persons, owing to the presence of a volatile principle, *Toxicodendric acid;* the white milky sap, turning black in drying, yields a valuable lacquer.

73. Rhus Metopium, L.

Poison-wood. Coral Sumach. Mountain Manchineel. Bum-wood. Hog Plum. Doctor-gum.

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A tree 12 to 15 metres in height, with a trunk sometimes 0.60 metre in diameter, reaching, in the United States, its greatest development on the shores of Bay Biscayne, near Miami; one of the most common trees of the region, the large specimens generally decayed.

Wood heavy, hard, not strong, close-grained, checking badly in drying, containing many evenly distributed open ducts; medullary rays numerous, thin; color rich dark brown streaked with red, the sap-wood light brown or yellow.

A resinous gum, emetic, purgative, and diuretic, is obtained from incisions made in the bark of this species.

74. Pistacia Mexicana, HBK.

Texas, — valley of the Rio Grande near the mouth of the Pecos River; in northern Mexico.

Wood not examined.

LEGUMINOSÆ.

75. Eysenhardtia orthocarpa, Watson.

Western Texas, valleys of the upper Guadalupe and Rio Grande, west to the Santa Rita and Santa Catalina Mountains, Arizona; in northern Mexico.

A small tree, 5 to 6 metres in height, with a trunk 0.09 to 0.15 metre in diameter, or more often a low shrub; dry, gravelly soil, reaching its greatest known development, in the United States, near the summit of the Santa Catalina Mountains, at 3,000 feet elevation.

Wood heavy, hard, close-grained, very compact; layers of annual growth clearly defined by numerous rows of open ducts; medullary rays numerous, thin; color light reddish-brown, the sap-wood clear yellow.

76. Dalea spinosa, Gray.

Colorado Desert, southern California to the valley of the lower Gila River, Arizona.

A small tree, sometimes 6 metres in height, with a short, stout trunk 0.45 to 0.50 metre in diameter, or often a low shrub; dry, gravelly, rocky soil.

Wood light, soft, rather coarse-grained, containing many regularly distributed open ducts; medullary rays numerous, thin; color walnut brown, the sap-wood nearly white.

77. Robinia Pseudacacia, L.

Locust. Black Locust. Yellow Locust.

Alleghany Mountains, from Pennsylvania to northern Georgia; widely and generally naturalized throughout the United States east of the Rocky Mountains, and possibly indigenous in northeastern and western Arkansas, and on the prairies of eastern Indian Territory.

A tree 22 to 25 metres in height, with a trunk 0.90 to 1.20 metres in diameter; west of the Mississippi River much smaller, or often a low shrub 1.80 to 3 metres in height, reaching its greatest development on the western slopes of the mountains of West Virginia.

Wood heavy, exceedingly hard and strong, close-grained, compact, very durable in contact with the ground; layers of annual growth clearly marked by two or three rows of large open ducts; color brown or more rarely light green, the sap-wood yellow; largely used for treenails, posts of all sorts, construction, and in turnery.

The bark of the root is tonic, or in large doses purgative and emetic. The locust was formerly widely planted as a timber tree; its cultivation in the United States is now generally abandoned on account of the destructive attacks of the locust-borer (*Cyllene picta*).

78. Robinia viscosa, Vent.

Clammy Locust.

High Alleghany Mountains of North Carolina.

A small tree, 9 to 12 metres in height, with a trunk not exceeding 0.30 metre in diameter; very rare and local in a wild state, but now widely cultivated and occasionally naturalized in the Atlantic States.

Wood (of a cultivated specimen) heavy, hard, close-grained, compact; layers of annual growth clearly marked by many rows of open ducts; medullary rays numerous, thin; color brown, the sap-wood light yellow.

79. Robinia Neo-Mexicana, Gray.

Locust.

Southern Colorado, through western and southwestern New Mexico to the Santa Catalina and Santa Rita Mountains, Arizona, and in southern Utah.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.25 metre in diameter, or toward its upper limits of growth reduced to a low shrub; reaching its greatest development in the valley of the Purgatory River, Colorado.

Wood heavy, exceedingly hard, strong, close-grained, compact, satiny, containing many evenly distributed open ducts; medullary rays thin, conspicuous; color yellow streaked with brown, the sap-wood light yellow.

80. Olneya Tesota, Gray.

Iron-wood. Arbol de Hierro.

California, valley of the Colorado River south of the Mohave Mountains, valley of the lower Gila River, southwestern Arizona; southward in Sonora.

A small tree, in the United States rarely 9 metres in height, with a trunk sometimes 0.45 metre in diameter; dry *arroyos* and cañons; in Sonora more common and of larger size.

Wood very heavy and hard, strong, brittle, close-grained, compact; the grain generally contorted, difficult to cut and work, susceptible of a high polish; medullary rays numerous, thin; color rich dark brown streaked with red, the sap-wood clear bright yellow; occasionally manufactured into canes and other small objects.

81. Piscidia Erythrina, L.

Jamaica Dogwood.

Semi-tropical Florida, — Bay Biscayne and Pease Creek to the southern keys; in the West Indies and southern Mexico.

A tree 12 to 15 metres in height, with a trunk 0.45 to 0.75 metre in diameter.

Wood heavy, very hard, not strong, close-grained, compact, susceptible of a high polish, containing few large scattered open ducts; medullary rays thin, not conspicuous; color yellowish brown, the sap-wood lighter; one of the most valuable woods of the region for boat-building, firewood, and charcoal.

The bark, especially of the root, narcotic, occasionally administered in the form of tinctures, or used, as well as the young branches and leaves, to poison or stupefy fish.

82. Cladrastis tinctoria, Raf.

Yellow-wood. Yellow Ash. Gopher-wood.

Central Kentucky, and middle Tennessee to the mountains of East Tennessee and Cherokee County, North Carolina.

A tree 9 to 15 metres in height, with a trunk sometimes 0.90 metre, or exceptionally 1.20 metres, in diameter; rich hillsides; reaching its greatest development in middle Tennessee; rare and very local, the large trees generally hollow or defective.

Wood heavy, very hard, strong, close-grained, compact, susceptible of a good polish; layers of annual growth clearly marked by several rows of open ducts, and containing many evenly distributed similar ducts; color bright clear yellow, changing with exposure to light brown, the sap-wood nearly white; used for fuel, occasionally for gunstocks, and yielding a clear yellow dye.

83. Sophora secundiflora, Lagasca.

Frigolito.

Matagorda Bay, Texas, west to the mountains of New Mexico.

A small tree, sometimes 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often, especially west of the San Antonio River, a tall shrub rarely exceeding 2 metres in height, and forming dense thickets; borders of streams, generally in low, rather moist soil.

Wood very heavy, hard, close-grained, compact, susceptible of a high polish; medullary rays numerous, thin; color orange streaked with red, the heavier sap-wood brown or yellow; furnishing valuable fuel.

The seeds contain an exceedingly poisonous alkaloid, *Sophoria.*

84. Sophora affinis, Torr. & Gray.

Valley of the Arkansas River, Arkansas to the valley of the San Antonio River, Texas.

A small tree, 5 to 7 metres in height, with a trunk sometimes 0.15 to 0.25 metre in diameter; borders of streams and prairies.

Wood heavy, very hard, strong, coarse-grained, compact; layers of annual growth clearly marked with several rows of large open ducts; medullary rays thin, conspicuous; color light red, the sap-wood bright clear yellow.

85. Gymnocladus Canadensis, Lam.

Kentucky Coffee-tree. Coffee-nut.

Southern Pennsylvania (rare); western New York (rare); west through southern Ontario and southern Michigan to the valley of the Minnesota River, Minnesota, eastern Nebraska, eastern Kansas, southwestern Arkansas, and the Indian Territory, extending south to middle Tennessee.

A tree 25 to 33 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich woods and bottom-lands; not common.

Wood heavy, not hard, strong, coarse-grained, durable in contact with the ground, liable to check in drying, easily worked, susceptible of a high polish; layers of annual growth clearly marked by one or two rows of open ducts; medullary rays numerous, thin; color light rich brown tinged with red, the thin sap-wood lighter; occasionally used in cabinet-making, for posts, rails, etc.

The fresh leaves, macerated and sweetened, are occasionally used as a poison for house-flies; the seeds, formerly as a domestic substitute for coffee.

86. Gleditschia triacanthos, L.

Honey Locust. Black Locust. Three-thorned Acacia. Sweet Locust. Honey Shucks.

Western slopes of the Alleghany Mountains of Pennsylvania, west through southern Michigan to eastern Nebraska, eastern Kansas, and the Indian Territory; south to Tampa Bay, Florida (not detected in east Florida), northern Alabama, northern Mississippi, and the valley of the Brazos River, Texas.

A tree 25 or 30 metres, or exceptionally 40 metres, in height, with a trunk 0.60 to 1.20 metres in diameter; low, rich bottom-lands, or more rarely on dry, sterile hills; the characteristic tree of the "barrens" of middle Kentucky and Tennessee; reaching its greatest development on the bottom-lands of the lower Ohio River basin; widely cultivated for shade and as a hedge plant, and now somewhat naturalized in the Atlantic States east of the Alleghany Mountains. A not uncommon form, nearly destitute of thorns, is var. *inermis*, Pursh.

Wood heavy, hard, strong, coarse-grained, moderately compact, very durable in contact with the soil, susceptible of a high polish; layers of annual growth strongly marked by many rows of open ducts; medullary rays numerous, conspicuous; color bright brown or red, the sap-wood lighter; used for fence posts and rails, wagon hubs, construction, etc.

87. Gleditschia monosperma, Walt.

Water Locust.

South Carolina, generally near the coast, to Matanzas Inlet and Tampa Bay, Florida, through the Gulf States to the valley of the Brazos River, Texas, and through Arkansas to middle Kentucky and Tennessee, southern Indiana and Illinois.

A tree 12 to 18 metres in height, with a trunk sometimes 0.60 or, exceptionally, 0.90 metre in diameter; deep swamps; rare in the south Atlantic and Gulf States; common and reaching its greatest development on the bottom-lands of southern Arkansas, Louisiana, and eastern Texas, here often covering extensive areas.

Wood heavy, very hard, strong, rather coarse-grained, compact, susceptible of a high polish; layers of annual growth clearly marked by one to three rows of open ducts; medullary rays thin, conspicuous; color rich bright brown tinged with red, the thick heavier sap-wood clear light yellow.

88. Parkinsonia Torreyana, Watson.

Green-barked Acacia. Palo Verde.

Colorado Desert, southern California to the valley of the lower Gila River, Arizona.

A low, much-branched tree, 8 to 10 metres in height, the short trunk sometimes 0.45 to 0.50 metre in diameter; low cañons and depressions in the sand-hills of the desert; common and reaching its greatest development in the valleys of the lower Colorado and Gila Rivers.

Wood heavy, not strong, soft, close-grained, compact, satiny, susceptible of a beautiful polish, containing many small, evenly distributed, open ducts; medullary rays very numerous, thin; color light brown, the sap-wood clear light yellow.

89. Parkinsonia microphylla, Torr.

Valleys of the lower Colorado and Bill Williams Rivers, eastward through southern Arizona.

A small, much-branched tree, 6 to 7 metres in height, with a trunk 0.25 to 0.30 metre in diameter; or often a low shrub, 1 to 3 metres in height.

Wood heavy, hard, coarse-grained, compact, containing numerous large scattered open ducts; medullary rays numerous, thin, conspicuous; color dark rich brown streaked with red, the sap-wood light brown or yellow.

90. Parkinsonia aculeata, L.

Corpus Christi, Texas, west along the Mexican boundary to the valley of the Colorado River, Arizona, and southward into Mexico; probably of American origin, but now widely naturalized throughout the tropical and warmer regions of the globe.

A small tree, 6 to 12 metres in height, with a trunk sometimes 0.30 metre in diameter.

Wood heavy, hard, very close-grained, inclined to check in drying, containing many evenly distributed small open ducts; medullary rays very numerous, thin, conspicuous; color light brown, the very thick sap-wood lighter, often tinged with yellow.

91. Cercis Canadensis, L.

Red-bud. Judas Tree.

Western Pennsylvania, south to Tampa Bay, Florida, and northern Alabama and Mississippi, west through southern Michigan and Minnesota to eastern Nebraska; southwest through Missouri and Arkansas to the eastern portions of the Indian Territory, Louisiana, and the valley of the Brazos River, Texas.

A small tree, 12 to 16 metres in height, with a trunk sometimes 0.30 metre in diameter; rich woods, borders of streams, and swamps; most common and reaching its greatest development in southern Arkansas, the Indian Territory, and eastern Texas.

Wood heavy, hard, not strong, rather coarse-grained, compact, susceptible of a good polish; layers of annual growth clearly marked by one to three rows of open ducts; medullary rays exceedingly numerous, thin; color rich dark brown tinged with red, the sap-wood lighter.

92. Cercis reniformis, Engelm.

Red-bud.

Middle and western Texas west of the Colorado River; in northern Mexico.

A small tree, 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a shrub forming dense thickets; limestone hills.

Wood heavy, hard, close-grained, compact; layers of annual growth clearly marked by one to three rows of open ducts; medullary rays numerous, not conspicuous; color brown streaked with yellow, the sap-wood lighter.

93. Prosopis juliflora, DC.

Mesquit. Algaroba. Honey Locust. Honey Pod.

Texas, — valley of the Trinity River to the northern and western limits of the State; west through New Mexico and Arizona to the western foothills of the San Bernardino Mountains, California, reaching southern Colorado, southern Utah, and southern Nevada; in northern Mexico.

A tree of the first economic value, sometimes 9 to 15 metres in height, with a trunk 0.90 metre in diameter, or much smaller, often reduced to a low shrub; dry prairies and high rocky plains, or west of the Rocky Mountains, along desert streams, here often forming open forests, and

reaching its greatest development, within the United States, in the valley of the Santa Cruz and other streams of southern Arizona; in western Texas, owing to the annual burning of the prairies, rarely 1 metre in height, the roots then enormously developed, often weighing several hundred pounds, and forming, as they are here locally known, "underground forests," furnishing the best and cheapest fuel of the region.

Wood heavy, very hard, not strong, close-grained, compact, difficult to work, almost indestructible in contact with the soil, containing many evenly distributed, rather large, open ducts; medullary rays numerous, distinct; color rich dark brown or often red, the sap-wood clear yellow; exclusively used for the beams and underpinnings of the adobe houses of New Mexico, Arizona, and northern Mexico, for posts and fencing, and occasionally in the manufacture of furniture, the fellies of heavy wheels, etc.; the best and often the only fuel of the region, burning slowly with a clear flame, and producing valuable charcoal, but unsuited for the generation of steam on account of its destructive action upon boilers.

A gum resembling gum-arabic is yielded by this species; the unripe and pulpy pods rich in grape sugar, are edible, furnishing valuable and important fodder.

94. Prosopis pubescens, Benth.

Screw Bean. Screw-pod Mesquit. Tornilla.

Valley of the Rio Grande in western Texas, west through New Mexico and Arizona to southern California, southern Utah and southern Nevada; in northern Mexico.

A small tree, rarely 9 metres in height, with a trunk sometimes 0.30 to 0.45 metre in diameter, or often a tall, much-branched shrub; sandy or gravelly river-bottoms, reaching its greatest development, within the United States, in the valleys of the lower Colorado and Gila Rivers.

Wood heavy, exceedingly hard, not strong, brittle, close-grained, compact, containing many evenly distributed open ducts; medullary rays numerous, thin; color light brown, the sap-wood somewhat lighter; used for fuel and fencing.

The pods used as fodder are sometimes made into flour by the Indians.

95. Leucæna glauca, Benth.

Western Texas, — San Saba to Devil's River; in northern Mexico; semi-tropical Florida (introduced); and through the West Indies.

A small tree, 7 to 9 metres in height, with a trunk 0.10 to 0.15 metre in diameter; or often a tall or, in Florida, low shrub, sending up many stems from the ground.

Wood heavy, hard, close-grained, compact, containing many small regularly distributed open ducts; layers of annual growth and medullary rays hardly distinguishable; color rich brown streaked with red, the sap-wood clear yellow.

96. Leucæna pulverulenta, Benth.

Southern Texas, — valley of the lower Rio Grande; in northern Mexico.

A small tree, 6 to 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter, often forming dense thickets; rich, sandy loam.

Wood heavy, hard, very close-grained, compact, containing many small, regularly distributed, open ducts; medullary rays very numerous, thin, conspicuous; color rich dark brown, the sap-wood clear yellow.

97. Acacia Wrightii, Benth.

Cat's Claw.

Valley of the Guadalupe River, western Texas, west and south to the valley of the Rio Grande; in northern Mexico.

A small tree, rarely 9 metres in height, with a trunk sometimes exceeding 0.30 metre in diameter, or often a low, much-branched shrub.

Wood very heavy, hard, very close-grained, compact; layers of annual growth marked by one or two rows of small open ducts, and containing many scattered smaller ducts; medullary rays hardly distinguishable; color bright clear brown streaked with red and yellow, the sap-wood clear yellow.

98. Acacia Greggii, Gray.

Cat's Claw.

Valley of the Rio Grande in western Texas, west through southern New Mexico and Arizona to San Diego, California; in northern Mexico.

A low, much-branched tree, sometimes 9 metres in height, with a trunk rarely 0.45 metre in diameter, or often a shrub; dry slopes and low cañons; common, the large specimens generally hollow and defective.

Wood heavy, exceedingly hard, strong, brittle, close-grained, compact; layers of annual growth marked by numerous rows of rather large open ducts; medullary rays numerous, thin; color rich brown or red, the sap-wood light yellow.

A resinous gum resembling gum-arabic is yielded by this species.

99. Acacia Berlandieri, Benth.

Valley of the Nueces to Devil's River, southern Texas, southward into Mexico.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter; or more often a tall shrub, sending up many stems from the ground.

Wood not examined.

100. Lysiloma latisiliqua, Benth.

Wild Tamarind.

Southern keys of semi-tropical Florida; in the West Indies.

A tree sometimes 15 metres in height, with a trunk 0.60 to 0.90 metre in diameter.

Wood heavy, hard, not strong, tough, close-grained, compact, susceptible of a fine polish, containing many scattered open ducts; medullary rays numerous, not conspicuous; color rich dark brown tinged with red, the sap-wood white; somewhat used, locally, in boat and ship building.

101. Pithecolobium Unguis-cati, Benth.

Cat's Claw.

Semi-tropical Florida, — Caximbas Bay to the southern keys; in the West Indies.

A small tree, sometimes 6 metres in height, with a trunk rarely exceeding 0.15 metre in diameter, or often throwing out many spreading, vine-like stems from the ground.

Wood very heavy, hard, close-grained, checking badly in drying; medullary rays numerous, inconspicuous; color rich red varying to purple, the sap-wood clear yellow.

ROSACEÆ.

102. Chrysobalanus Icaco, L.

Cocoa Plum.

Semi-tropical Florida, — Cape Canaveral and Caximbas Bay to the southern keys; through the West Indies and tropical America to Brazil.

A small tree, 7 to 10 metres in height, with a trunk 0.15 to 0.30 metre in diameter; or along sandy beaches a low prostrate shrub 1.08 to 2.16 metres in height; reaching its greatest development, within the United States, on the borders and islands of the Everglades, near Bay Biscayne.

Wood heavy, hard, strong, close-grained, compact, containing few irregularly distributed, not large, open ducts; medullary rays numerous, thin; color light brown often tinged with red, the sap-wood lighter.

103. Prunus Americana, Marsh.

Wild Plum. Canada Plum. Horse Plum.

Valley of the Saint Lawrence to the valleys of Rainy and Assinaboine Rivers and the southern shores of Lake Manitoba; northern Vermont, western New England, and southward through the Atlantic States to western Florida; west to the valley of the upper Missouri River, Dakota, Pike's Peak region, Colorado, and the valley of the lower Concho River, Texas.

A small tree, 6 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; rich woods, or along streams and the borders of ponds and swamps, reaching its greatest development on the bottom-lands of eastern Texas.

Wood heavy, very hard, strong, very close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin; color rich bright brown or often red, the sap-wood lighter; used for the handles of tools, etc.

Often cultivated for the yellow, red, or rarely nearly black acid, or rarely sweet fruit.

104. Prunus angustifolia, Marsh.

Chickasaw Plum. Hog Plum.

Probably native of the eastern slopes of the southern Rocky Mountains, where it is found at an altitude of 7,000 feet, and of the high plateau east and southeast of them; now widely naturalized by early cultivation throughout the Atlantic forests south of Pennsylvania and west of the Alleghany Mountains, extending as far north as southern Michigan.

A small tree, 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a low shrub, generally along streams or borders of prairies, in rich soil.

Wood heavy, soft, not strong, close-grained, compact; medullary rays numerous, thin; color light brown or red, the sap-wood lighter. Often cultivated for its globose red or yellow fruit.

105. Prunus Pennsylvanica, L. f.

Wild Red Cherry. Pin Cherry. Pigeon Cherry.

Labrador, shores of Hudson's Bay, and west through the Saskatchewan region to the valley of the upper Fraser River; south through the northern States to Pennsylvania, central Michigan, northern Illinois, central Iowa, and along the high Alleghany Mountains of North Carolina and Tennessee, and the Rocky Mountains of Colorado.

A small tree, rarely exceeding 12 metres in height, with a trunk sometimes 0.60 metre in diameter, or in the Rocky Mountain region reduced to a low shrub; common in all the northern forests, and taking possession of ground cleared by fire of forest growth.

Wood light, soft, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood clear yellow.

The small acid fruit used domestically and by herbalists in the preparation of cough mixtures, etc.

106. Prunus umbellata, Ell.

Sloe. Black Sloe.

South Carolina, south near the coast to Mosquito Inlet and Tampa Bay, Florida, and through central Alabama to eastern Mississippi.

A small tree, 5 to 6 metres in height, with a trunk 0.25 to 0.38 metre in diameter; dry, sandy soil.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin; color dark reddish brown, the sap-wood much lighter.

107. Prunus emarginata, Walp.

Vancouver's Island and the valley of the lower Fraser River, south through western Washington and Oregon, and along the western slopes of the Sierra Nevada and in the Coast Ranges, from San Francisco Bay to the Santa Lucia Mountains, California; east to the western slopes of the Bitter Root Mountains, Idaho, and the valley of the Jocko River, Montana.

A tree often 12 to 15 metres in height, with a trunk sometimes exceeding 0.30 metre in diameter; at high elevations and throughout central California reduced to a shrub 2 to 3 metres in height, or, in the Santa Lucia Mountains, 15 to 18 metres in height, with a trunk 0.60 to 0.90 metre in diameter; generally along streams or in low, rich woods. The common northern and Idaho form, more or less woolly pubescent, especially on the under side of the leaves, is var. *mollis*, Brewer.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, thin; color brown streaked with green.

108. Prunus serotina, Ehrh.

Wild Black Cherry. Rum Cherry.

Southern Ontario, southward through the Atlantic forests to Matanzas Inlet and Tampa Bay, Florida; west to the valley of the Missouri River, Dakota, eastern Kansas, the Indian Territory, and the valley of the upper San Antonio River, Texas.

A tree 18 to 30 metres in height, with a trunk 0.90 to 1.20 metres, or exceptionally 1.50 metres, in diameter; rich, generally upland woods; common and reaching its greatest development on the western slopes of the Alleghany Mountains from West Virginia southward; not common and of small size in the Gulf region and Texas.

Wood light, hard, strong, close, straight-grained, compact, easily worked; medullary rays numerous, thin; color light brown or red, growing darker with exposure, the thin sap-wood yellow; largely used and esteemed in cabinet work, interior finish, etc., and now becoming scarce.

The bark contains a bitter tonic principle, and infused with cold water generates a small percentage of hydrocyanic acid, and is employed as a tonic and sedative in cases of pulmonary consumption in the form of cold infusions, syrups, and fluid extracts; the bitter fruit used domestically in the preparation of cherry brandy.

109. Prunus Capuli, Cav.

Wild Cherry.

Apache and Guadalupe Mountains, Texas, west through southern New Mexico and Arizona to the southern slopes of the San Francisco Mountains; in northern New Mexico, and Peru.

A small tree, in the United States rarely 12 metres in height, with a trunk often 0.30 metre in diameter; bottoms of cañons and mountain valleys, generally between 5,000 and 7,000 feet elevation.

Wood heavy, moderately hard, close-grained, compact; medullary rays very numerous, thin; color brown, or often bright clear red, the sap-wood nearly white.

110. Prunus demissa, Walp.

Wild Cherry.

Vancouver's Island, east to the western slopes of the Rocky Mountains of Montana, south through the Pacific region; and in Sonora.

A small tree, sometimes 7 to 10 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or more often a low shrub; reaching its greatest development in the rich valleys of southern Oregon and northern California, near the coast; in southern California, and east of the Cascade and Sierra Nevada Ranges, a low shrub confined to high mountain valleys.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, conspicuous; color light brown, the sap-wood lighter.

111. Prunus Caroliniana, Ait.

Wild Orange. Mock Orange. Wild Peach.

North Carolina, south, near the coast, to Bay Biscayne, Florida, southern Alabama, and west, along the Gulf coast, to the valley of the Guadalupe River, Texas.

A small evergreen tree, 10 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; common and reaching its greatest development in the rich, light, deep soil of the bottom-lands of eastern Texas.

Wood heavy, hard, strong, close-grained, checking badly in drying, susceptible of a good polish; medullary rays numerous, thin; color light reddish-brown, or, more rarely, dark rich brown, the sap-wood lighter.

112. Prunus sphærocarpa, Sw.

Western shores of Bay Biscayne, Florida; in the West Indies.

A small tree, in Florida not exceeding 6 metres in height, with a trunk 0.10 to 0.15 metre in diameter; high rocky woods, or more rarely along the borders of streams and ponds; rare and local in the United States.

Wood heavy, hard, close-grained, checking badly in drying, containing many very small open ducts; layers of annual growth and medullary rays obscure; color light clear red, the sap-wood pale yellow.

113. Prunus ilicifolia, Walp.

Islay.

California, — Coast Ranges from San Francisco Bay south to the southern boundary of the State, extending to the western slopes of the San Bernardino and San Jacinto Mountains.

A small evergreen tree, often 9 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or in the interior often reduced to a low shrub.

Wood very heavy, hard, strong, close-grained, checking in seasoning, satiny, susceptible of a beautiful polish, containing many regularly distributed, rather small, open ducts; medullary rays numerous, thin; color bright reddish brown, the sap-wood much lighter; furnishing valuable fuel.

114. Vauquelinia Torreyi, Watson.

Arizona, — high mountains of the Gila Valley, summits of the Santa Catalina Mountains; in Sonora.

A small tree in the Santa Catalina Mountains, 4 to 6 metres in height, with a trunk 0.10 to 0.20 metre in diameter; dry slopes and rocky bluffs between 2,700 and 4,000 feet elevation, in granitic soil; generally hollow and decayed.

Wood very heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, thin; color rich dark brown streaked with red, the sap-wood yellow.

115. Cercocarpus ledifolius, Nutt.

Mountain Mahogany.

Cœur d'Alene Mountains, Idaho, southward along the western slopes of the Rocky Mountains of Montana and Wyoming; eastern extremities of the Blue Mountains of Washington and Oregon; Wahsatch Mountains, Utah, and west along the mountain ranges of the Great Basin to the western slope of the Sierra Nevada of California, extending southward into Arizona and New Mexico.

A small, low tree, rarely 12 metres in height, with a trunk sometimes 0.60 to 0.90 metre in diameter, or north of Utah and Nevada reduced to a low shrub; dry rocky mountain slopes, between 6,000 and 8,000 feet elevation, reaching its greatest development on the high ranges of central Nevada.

Wood very heavy, hard, close-grained, compact, brittle, difficult to work, susceptible of a beautiful polish; medullary rays very numerous, thin; color bright clear red, or often dark rich brown, the sap-wood clear yellow; furnishing the most valuable fuel of the region, and largely manufactured into charcoal.

116. Cercocarpus parvifolius, Nutt.

Mountain Mahogany.

California, — valley of the Klamath River, southward through the Coast Ranges to the San Bernardino and San Jacinto Mountains; Lower California; Rocky Mountains of Wyoming, Colorado, and New Mexico, mountains of southern Arizona, and southward into Mexico.

A small tree, rarely 6 to 9 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often a shrub; dry, gravelly soil, reaching its greatest development on the mountains of southern New Mexico and Arizona at an elevation of 6,000 to 8,000 feet.

Wood very heavy, hard, close-grained, compact, difficult to work, susceptible of a beautiful polish; medullary rays numerous, thin; color bright reddish brown, the sap-wood light brown; furnishing valuable fuel.

117. Pyrus coronaria, L.

American Crab. Sweet-scented Crab.

Valley of the Humber River, and shores of Lake Erie, Ontario, southward through western New York and Pennsylvania to the District of Columbia, and along the Alleghany Mountains to central Alabama and northern Mississippi; west to southern Minnesota, Iowa, eastern Kansas, the Indian Territory, and northern Louisiana.

A small tree, rarely 6 to 9 metres in height, with a trunk often 0.30 metre in diameter; rich, rather low woods, reaching its greatest development in the valleys of the lower Ohio region.

Wood heavy, rather soft, not strong, very close-grained, checking badly in drying; medullary rays numerous, obscure; color brown varying to light red, the sap-wood yellow; used for levers, handles of tools, and in turnery.

118. Pyrus angustifolia, Ait.

American Crab Apple. Southern Crab Apple.

Pennsylvania(?), southern Delaware, and the valley of the lower Wabash River, Illinois, south to western Florida.

A small tree, 6 to 9 metres in height, with a trunk rarely 0.30 metre in diameter; low, rich woods; common and reaching its greatest development on the bottom-lands of the South Atlantic States; less common west of the Alleghany Mountains.

Wood heavy, hard, close-grained, checking badly in drying; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood yellow; used for levers, handles of tools, etc.

119. Pyrus rivularis, Dougl.

Oregon Crab Apple.

Coast of Alaska, southward along the coast and islands of British Columbia, through Washington and Oregon, west of the Cascade Mountains, to northern California.

A small tree, sometimes 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; low, rich woods, generally along streams, often forming dense thickets.

Wood heavy, hard, very close-grained, liable to check badly in drying, susceptible of a beautiful polish; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter; used for mallets, mauls, bearings of machinery, etc.

120. Pyrus Americana, DC.

Mountain-ash.

Labrador, Newfoundland, Anticosti Island, and westward along the southern shore of James Bay to the valley of the Nelson River, southward through all the elevated regions of the northeastern States, and along the high mountains of Virginia and North Carolina; in northern Michigan, northern Wisconsin, and northern Minnesota.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; borders of swamps and moist, rocky woods, reaching its greatest development on the northern shores of Lakes Huron and Superior.

Wood light, soft, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood lighter.

121. Pyrus sambucifolia, Cham. & Schlecht.

Mountain-ash.

Labrador to northern New England and the shores of Lake Superior; high mountain ranges of the Pacific region from Alaska to southern New Mexico; in Kamtschatka.

A small tree, 9 to 12 metres in height, with a trunk sometimes 0.30 metre in diameter, or in the Pacific forests generally reduced to a low shrub; cold, wet swamps or borders of streams, reaching its greatest development in northern New England and Minnesota.

Wood light, soft, weak, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood nearly white.

The astringent bark and unripe fruit of the American mountain ashes, like those of the nearly allied *P. aucuparia* of Europe, are extremely astringent, and occasionally used, domestically, in infusions, decoctions, etc., in the treatment of diarrhœa.

122. Cratægus rivularis, Nutt.

British Columbia, south through eastern Oregon and Washington, east and southeast along the mountain ranges of Idaho, Montana, Utah, and Colorado to the Pinos Altos Mountains, New Mexico.

A small tree, 6 to 8 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; or often a tall, much-branched shrub, forming dense, impenetrable thickets along borders of streams and swamps.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin; color bright reddish brown, the sap-wood nearly white.

123. Cratægus Douglasii, Lindl.

British Columbia, south through Washington and Oregon to northern California, extending east through Idaho and Montana to the western base of the Rocky Mountains.

A small tree, sometimes 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or often a tall shrub throwing up many stems from the ground and forming impenetrable thickets; rather wet, sandy soil along streams, and reaching its greatest development in the valleys west of the Cascade Mountains; toward its eastern limits a low shrub.

Wood heavy, hard, tough, close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin; color nearly white tinged with rose, the sap-wood lighter; used for wedges, mauls, etc.

124. Cratægus brachyacantha, Sargent & Engelm.

Hog's Haw.

Western Louisiana and eastern Texas.

A tree 9 to 12 metres in height, with a trunk sometimes 0.60 metre in diameter; borders of streams in low, very rich soil; the largest North American representative of the genus; rare and local.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, very obscure; color light brown tinged with rose, the sap-wood lighter.

The large fruit blue-black.

125. Cratægus arborescens, Ell.

Valley of the Savannah River, South Carolina, south to western Florida; and from the neighborhood of Saint Louis, Missouri, south and southwest to western Louisiana, and the valley of the lower Colorado River, Texas.

A small tree, 6 to 9 metres in height, with a trunk sometimes 0.45 to 0.60 metre in diameter; borders of streams and low, wet swamps.

Wood heavy, hard, not strong, close-grained, compact; susceptible of a beautiful polish; medullary rays very numerous, obscure; color light brown tinged with red, the sap-wood lighter.

The small globular fruit bright red, or, more rarely, orange.

126. Cratægus Crus-galli, L.

Cockspur Thorn. Newcastle Thorn.

Valley of the Saint Lawrence River, west through southern Ontario to Manitoba, south, through the Atlantic forests, to western Florida, and the valley of the Colorado River, Texas.

A small tree, 4 to 10 metres in height, with a trunk sometimes 0.30 metre in diameter; varying greatly in the size of the fruit, size and shape of the leaves, etc.

Wood heavy, hard, not strong, close-grained, compact, satiny, susceptible of a fine polish; medullary rays numerous, very obscure; color brown tinged with red, the sap-wood rather lighter.

127. Cratægus coccinea, L.

Scarlet Haw. Red Haw. White Thorn.

West coast of Newfoundland, west along the valley of the Saint Lawrence River and the northern shores of the great lakes to Manitoba, south through the Atlantic forests to northern Florida and eastern Texas.

A small tree, sometimes 9 metres in height, with a trunk 0.30 metre in diameter; open upland woods or borders of streams and prairies; very common at the North, rare at the South; running into many forms, varying in the size and shape of the leaves, size of the fruit, etc.

Wood heavy, hard, close-grained, compact; medullary rays thin, very obscure; color brown tinged with red, the sap-wood a little lighter.

128. Cratægus subvillosa, Schrad.

Scarlet Haw.

Eastern Massachusetts (possibly introduced); central Michigan to eastern Nebraska, south to middle Tennessee, and southwest through Missouri, Arkansas, the Indian Territory, and Texas to the valley of the San Antonio River.

A small tree, 7 to 9 metres in height, with a trunk rarely 0.45 metre in diameter; rich woods and borders of streams and prairies.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, very obscure; color light brown or light red, the sap-wood lighter.

The large red fruit often downy, edible, of agreeable flavor.

129. Cratægus tomentosa, L.

Black Thorn. Pear Haw.

New Brunswick, west along the valley of the Saint Lawrence River and the northern shores of the great lakes to the Saskatchewan region, southward through the Atlantic forests to western Florida and eastern Texas, extending west to the mountains of eastern Washington and Oregon, southwestern Colorado, and southwestern New Mexico.

A small tree, 6 to 9 metres in height, with a trunk rarely 0.45 metre in diameter, or often, especially west of the Rocky Mountains, reduced to a low shrub, here forming dense thickets along mountain streams; the most widely distributed representative of the genus in North America, and varying greatly in the size, shape, and color of the fruit, form of the leaves, amount of pubescence, etc.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, thin; color bright reddish brown, the sap-wood lighter.

130. Cratægus cordata, Ait.

Washington Thorn.

Virginia, southward along the Alleghany Mountains to northern Georgia and Alabama, extending west through middle and eastern Kentucky and Tennessee to southern Illinois.

A small tree, 6 to 8 metres in height, with a trunk rarely 0.30 metre in diameter, generally along banks of streams.

Wood heavy, hard, close-grained, compact; medullary rays numerous, obscure; color brown tinged with red, the sap-wood lighter.

131. Cratægus apiifolia, Michx.

Parsley Haw.

Southern Virginia, southward near the coast to about latitude 28°, extending west through the Gulf States to southern Arkansas and the valley of the Trinity River, Texas.

A small tree, rarely 6 to 9 metres in height, with a slender stem rarely exceeding 0.08 to 0.10 metre in diameter, or more often a low, much-branched shrub; low, rich soil, reaching its greatest development on the pine-barren hummocks of central Florida.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays thin, very obscure; color bright brown tinged with red or rose, the sap-wood much lighter.

132. Cratægus spathulata, Michx.

Small-fruited Haw.

Virginia, southward to western Florida, west through the Gulf States to the valley of the Washita River, Arkansas, and the Colorado River, Texas.

A small tree, 6 to 8 metres in height, with a trunk 0.20 to 0.25 metre in diameter, or often reduced to a low shrub; margins of streams and prairies, common, and reaching its greatest development on the bottom-lands of western Louisiana and eastern Texas.

Wood heavy, hard, not strong, close-grained, compact; medullary rays very numerous, obscure; color light brown or red, the sap-wood lighter.

133. Cratægus berberifolia, Torr. & Gray.

Western Louisiana.

A small tree, 6 to 8 metres in height, with a trunk 0.20 to 0.25 metre in diameter; borders of prairies, in low ground; rare, local, and still very imperfectly known; the fruit and wood not yet collected.

134. Cratægus æstivalis, Torr. & Gray.

May Haw. Apple Haw.

South Carolina to northern Florida, and west through the Gulf States to southern Arkansas and the valley of the Sabine River, Texas.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter; generally in sandy soil along the margins of streams and ponds; common and reaching its greatest development on the bottom-lands of western Louisiana and eastern Texas.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, obscure; color light brown or red, the sap-wood lighter.

The large, globular, fragrant red fruit possesses an agreeable subacid flavor, and ripens in May.

135. Cratægus flava, Ait.

Summer Haw. Yellow Haw. Red Haw.

Virginia southward, generally near the coast, to Tampa Bay, Florida, extending west through the Gulf States to eastern Texas and southern Arkansas.

A small tree, rarely 7 metres in height, with a trunk 0.30 metre in diameter, or reduced to a much-branched shrub 2 to 3 metres in height; borders of streams, in low, sandy soil subject to overflow. A variety distinguished by the pubescence upon the calyx and young branches, smaller flowers, and larger globular or pear-shaped edible fruit, is var. *pubescens*, Gray.

Wood heavy, hard, close-grained, checking badly in drying, satiny, susceptible of a good polish; medullary rays very numerous, obscure; color light brown tinged with red or rose, the sap-wood lighter.

Fruit small, red or yellow, acid, or in the variety large and edible.

136. Heteromeles arbutifolia, Rœm.

Toyon. Tollon. California Holly.

California, — Coast Ranges, Mendocino to San Diego County, extending east to the foot-hills of the Sierra Nevada and San Bernardino Mountains.

A small, low-branched evergreen tree, rarely exceeding 9 metres in height, the short trunk sometimes 0.30 to 0.45 metre in diameter; or more often a low, much-branched shrub.

Wood very heavy, hard, close-grained, inclined to check in drying, satiny, susceptible of a beautiful polish; medullary rays numerous, very obscure; color dark reddish-brown, the sap-wood lighter.

137. Amelanchier Canadensis, Torr. & Gray.

June-berry. Shad-bush. Service Tree. May Cherry.

Newfoundland and Labrador, west along the southern shores of Hudson's Bay to the Saskatchewan region; south through the Atlantic forests to northern Florida, southwestern Arkansas, and the Indian Territory.

A small tree, 9 to 15 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or in some forms reduced to a low shrub (vars. *rotundifolia* and *oligocarpa*, Torr. & Gray); common at the north, rare at the south, and reaching its greatest development on the high slopes of the southern Alleghany Mountains; varying greatly in the shape of the leaves, size of the flowers, amount of pubescence on the leaves and young shoots, etc. (var. *oblongifolia*, Torr. & Gray).

Wood heavy, hard, strong, close-grained, satiny, susceptible of a good polish; medullary rays very numerous, obscure; color dark brown often tinged with red, the sap-wood much lighter.

HAMAMELACEÆ.

138. Hamamelis Virginica, L.

Witch-hazel.

Northern New England and southern Ontario to Wisconsin, south to northern Florida and eastern Texas.

A small tree, exceptionally 7 to 9 metres in height, with a trunk 0.30 to 0.37 metre in diameter, or more often a tall shrub throwing up many stems from the ground; common; rich, rather damp woodlands, reaching its greatest development upon the southern Alleghany Mountains.

Wood heavy, hard, very close-grained, compact; layers of annual growth hardly distinguishable; medullary rays numerous, thin, obscure; color light brown tinged with red, the sap-wood nearly white.

The bark and leaves rich in tannin, and largely used by herbalists in the form of fluid extracts, decoctions, etc., in external applications (Pond's Extract), and as a reputed remedy in hemorrhoidal affections.

139. Liquidambar Styraciflua, L.

Sweet Gum. Liquidamber. Red Gum. Bilsted.

Fairfield County, Connecticut, and southern Indiana and Illinois, southward to Cape Canaveral and Tampa Bay, Florida, and the valley of the Trinity River, Texas; in central and southern Mexico.

A large tree, often 30 to 36 metres, or exceptionally 48 metres, in height, with a trunk 1.20 to 1.80 metres in diameter; low, wet soil; very common and reaching its greatest development on the bottom-lands of the Mississippi Basin, — here, with the cotton-gum, forming a large proportion of the forest growth.

Wood heavy, hard, not strong, rather tough, close-grained, compact, inclined to shrink and warp badly in seasoning, susceptible of a beautiful polish; medullary rays numerous, very obscure; color bright brown tinged with red, the sap-wood nearly white; manufactured into lumber and used in the construction of buildings for plates, boarding, and clapboards, in cabinet work as a substitute for black walnut, and for veneering and street pavements.

The balsamic exudation obtained from this species at the South is collected by herbalists, and sometimes used in the form of a syrup as a substitute for storax in the treatment of catarrhal affections, or externally as an ointment.

RHIZOPHORACEÆ.

140. Rhizophora Mangle, L.

Mangrove.

Semi-tropical Florida, — Mosquito Inlet and Cedar Keys to the southern keys; Delta of the Mississippi River; coast of Texas; West Indies and tropical America; and now widely naturalized throughout the tropics of the Old World.

A tree 12 to 18 metres, or exceptionally 27 metres, in height, with a trunk 0.30 to 0.60 metre in diameter, or more commonly not exceeding 4 to 7 metres in height; low saline shores, reaching, in the United States, its greatest development on Bay Biscayne and Cape Sable; south of latitude 29°, bordering with almost impenetrable thickets the coast of the Florida peninsula, ascending the rivers for many miles, especially those flowing from the Everglades, and entirely covering many of the southern keys.

Wood exceedingly heavy, hard, and strong, close-grained, checking in drying, satiny, susceptible of a beautiful polish, containing many evenly distributed rather small open ducts; medullary rays numerous, thin; color dark reddish brown streaked with lighter brown, the sap-wood lighter; used for wharf piles and furnishing valuable fuel.

COMBRETACEÆ.

141. Conocarpus erecta, L.

Buttonwood.

Semi-tropical Florida, — Cape Canaveral and Tampa Bay to the southern keys; through the West Indies to Brazil.

A low tree, often 8 metres, or exceptionally 15 to 18 metres, in height, with a trunk sometimes 0.60 metre in diameter; common, and reaching its greatest development, in the United States, on Lost Man's River, north of Cape Sable; or sometimes reduced to a low under-shrub.

Wood very heavy and hard, strong, close-grained, very compact, suscep-

tible of a beautiful polish; medullary rays numerous, obscure; color dark yellow-brown, the sap-wood lighter; burning slowly like charcoal, and highly valued for fuel.

142. Laguncularia racemosa, Gærtn. f.

White Buttonwood. White Mangrove.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Cedar Keys to Cape Sable; West Indies and tropical America; coast of tropical Africa.

A small tree, sometimes 6 to 22 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or toward its northern limits reduced to a low shrub; very common; saline shores of lagoons and bays.

Wood very heavy and hard, strong, close-grained, very compact; susceptible of a beautiful polish; medullary rays numerous, obscure; color dark yellow-brown, the sap-wood much lighter.

MYRTACEÆ.

143. Calyptranthes Chytraculia, Sw.

Semi-tropical Florida, — shores of Bay Biscayne, Key Largo; in the West Indies.

A small tree, sometimes 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter.

Wood very heavy, hard, close-grained, compact, containing many evenly distributed rather large open ducts; medullary rays numerous, thin; color brown tinged with red, the sap-wood a little lighter.

144. Eugenia buxifolia, Willd.

Gurgeon Stopper. Spanish Stopper.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Caloosa River to Cape Romano; in the West Indies.

A small tree, rarely 6 to 9 metres in height, with a trunk sometimes 0.30 metre in diameter, reaching its greatest development, in the United States, on the rich hummocks of the Everglades.

Wood very heavy, exceedingly hard, very strong, close-grained, very compact; medullary rays numerous, thin; color dark brown shaded with red, the sap-wood a little lighter; somewhat used for fuel.

145. Eugenia dichotoma, DC.

Naked-wood.

Semi-tropical Florida, — Mosquito Inlet to Cape Canaveral, common, west coast, Caloosa River to Cape Romano; in the West Indies.

A small tree, sometimes 6 to 8 metres in height, with a trunk rarely 0.15 metre in diameter.

Wood very heavy, hard, close-grained, compact; medullary rays numerous, thin; color light brown or red, the sap-wood yellow.

The small, edible fruit of agreeable aromatic flavor.

146. Eugenia monticola, DC.

Stopper. White Stopper.

Saint John's River to Umbrella Key, Florida, rare; in the West Indies.

A small tree, rarely 7 metres in height, with a trunk 0.30 metre in diameter, or in northern Florida reduced to a low shrub.

Wood very heavy, hard and strong, very close-grained, compact; medullary rays numerous, thin; color brown often tinged with red, the sap-wood darker.

147. Eugenia longipes, Berg.

Stopper.

Semi-tropical Florida, — No Name Key; in the West Indies.

A small tree, 4 to 7 metres in height, with a trunk 0.15 to 0.20 metre in diameter; rare.

Wood very heavy, hard, close-grained, checking badly in drying, containing many evenly distributed open ducts; medullary rays numerous, very obscure; color dark brown or nearly black, the sap-wood brown tinged with red.

148. Eugenia procera, Poir.

Red Stopper.

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A tree 12 to 18 metres in height, with a trunk 0.30 to 0.45 metre in diameter; often forming extensive groves, and reaching its greatest development, in the United States, in the neighborhood of Miami, Bay Biscayne.

Wood very heavy, exceedingly hard, very strong and close-grained, compact; medullary rays numerous, hardly distinguishable; color light yellow-brown, the sap-wood darker.

CACTACEÆ.

149. Cereus giganteus, Engelm.

Suwarrow. Saguaro. Giant Cactus.

Valley of Bill Williams Fork, Arizona, south and east through central Arizona to the valley of the San Pedro River; southward in Sonora.

A tall, columnar tree, 8 to 18 metres in height, with a trunk sometimes 0.60 metre in diameter; dry, stony slopes, or low hills rising from the desert.

Wood of the large strong ribs very light, soft, rather coarse-grained, solid, satiny, susceptible of a fine polish, almost indestructible in contact with the ground; medullary rays very numerous, broad; color light brown tinged with yellow; used in the region almost exclusively for the rafters of adobe houses, for fencing, and by the Indians for lances, bows, etc.

The edible fruit is largely collected and dried by the Indians.

CORNACEÆ.

150. Cornus alternifolia, L. f.

Dogwood.

New Brunswick, west along the valley of the Saint Lawrence River to the northern shores of Lake Superior, south through the northern States and along the Alleghany Mountains to northern Georgia and Alabama.

A small tree, 4 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter; low, rich woods, and borders of streams and swamps.

Wood heavy, hard, close-grained, checking badly in drying; medullary rays numerous, thin; color brown tinged with red, the sap-wood light yellow.

151. Cornus florida, L.

Flowering Dogwood. Boxwood.

Southern New England, southern Ontario, southern Minnesota, and through the Atlantic forests to middle Florida, and the valley of the Brazos River, Texas.

A small tree, 9 to 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or toward its northern limits reduced to a low shrub; rich woods, common, especially at the south.

Wood heavy, hard, strong, close-grained, tough, checking badly in drying, satiny, susceptible of a beautiful polish. medullary rays numerous, conspicuous; color brown, changing in different specimens to shades of green and red, the sap-wood lighter; used in turnery, for wood engraving and the bearings of machinery, hubs of wheels, barrel-hoops, etc.

The bark, especially of the root, in common with that of the other species of the genus, possesses bitter tonic properties, and is used in the form of decoctions, etc., in the treatment of intermittent and malarial fevers.

152. Cornus Nuttallii, Audubon.

Flowering Dogwood.

Vancouver's Island, through western Washington and Oregon, and southward in California along the western slope of the Sierra Nevada and through the Coast Ranges to the San Bernardino Mountains.

A small, slender tree, sometimes 18 to 24 metres in height, with a trunk rarely 0.45 metre in diameter; reaching in the Cascade Mountains an

elevation of 3,000 feet, and in the San Bernardino Mountains, of from 4,000 to 5,000 feet; common; rich, rather damp soil, generally in the dense shade of coniferous forests.

Wood heavy, exceedingly hard, strong, close-grained, compact, satiny, susceptible of a good polish; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter; somewhat used in cabinet-making, for mauls, handles, etc.

153. Nyssa capitata, Walt.

Ogeechee Lime. Sour Tupelo. Gopher Plum.

Valley of the Ogeechee River, Georgia, to western Florida, and in southern Arkansas.

A tree 9 to 18 metres in height, with a trunk 0.30 to 0.90 metre in diameter; deep swamps and river bottoms; rare and local.

Wood light, soft, not strong, tough, rather coarse-grained, compact, unwedgeable, containing many regularly distributed open ducts; medullary rays numerous, thin; color white, the sap-wood hardly distinguishable.

A conserve, under the name of "Ogeechee limes," is prepared from the large, acid fruit.

154. Nyssa sylvatica, Marsh.

Tupelo. Sour Gum. Pepperidge. Black Gum.

Southern Maine and northern Vermont, west to central Michigan, south to Tampa Bay, Florida, and the valley of the Brazos River, Texas.

A tree 15 to 36 metres in height, with a trunk 0.60 to 1.50 metres in diameter, or at the north much smaller; borders of swamps, or on rather high, rich hillsides and pine uplands; at the south often in pine-barren ponds and deep swamps, the base of the trunk then greatly enlarged and swollen (*N. aquatica*, L.).

Wood heavy, rather soft, strong, very tough, unwedgeable, difficult to work, inclined to check unless carefully seasoned, not durable in contact with the soil, containing numerous regularly distributed small open ducts; medullary rays numerous, thin; color light yellow or often nearly white, the sap-wood hardly distinguishable; now largely used for the hubs of wheels, rollers in glass-factories, ox-yokes, and on the Gulf coast for wharf-piles.

155. Nyssa uniflora, Wang.

Large Tupelo. Cotton-gum. Tupelo-gum.

Southern Virginia, south near the coast to the valley of the Saint Mary's River, Georgia, through the Gulf States to the valley of the Neches River, Texas, and through Arkansas and southern and southeastern Missouri to southern Illinois.

A large tree, 21 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter; deep swamps and bottom-lands subject to frequent

overflow; one of the largest and most common trees of the bottom-lands of the lower Mississippi River basin, and reaching its greatest development in the cypress swamps of western Louisiana and eastern Texas, near the coast.

Wood light, soft, not strong, close-grained, compact, unwedgeable; medullary rays numerous, thin; color light brown, or often nearly white; used in turnery and largely for wooden-ware; that of the root for the floats of nets, etc., as a substitute for cork.

CAPRIFOLIACEÆ.

156. Sambucus glauca, Nutt.

Elder.

Valley of the Fraser River and Vancouver's Island, British Columbia, south to the Mexican boundary, extending east to the Blue Mountains of Oregon and the Wahsatch Range, Utah.

A small tree, sometimes 8 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or toward its northern limits reduced to a large shrub; mountain valleys, in dry, gravelly soil.

Wood light, soft, weak, coarse-grained, checking in drying; medullary rays numerous, rather conspicuous; color yellow tinged with brown, the sap-wood lighter.

157. Sambucus Mexicana, Presl.

Elder.

Valley of the Nueces River, south through western Texas, west along the southern boundary of the United States to southern California; in northern Mexico.

A small tree, sometimes 6 metres in height, with a trunk 0.15 to 0.25 metre in diameter; bottom-lands, in moist, gravelly loam.

Wood light, soft, rather coarse-grained, compact; medullary rays numerous, thin, conspicuous; color light brown, the sap-wood lighter.

158. Viburnum Lentago, L.

Sheep-berry. Nanny-berry.

Southern shores of Hudson Bay, west in British America to about longitude 102°, south through the northern States to Pennsylvania, southern Indiana, eastern Missouri, and along the Alleghany Mountains to northern Georgia.

A small tree, 6 to 9 metres in height, with a trunk sometimes 0.15 to 0.25 metre in diameter; rocky ridges and borders of streams and swamps, in rich, moist soil; most common and reaching its greatest development far north.

Wood heavy, hard, close-grained, compact, emitting a disagreeable odor; medullary rays thin, barely distinguishable; color dark orange-brown, the sap-wood nearly white.

159. Viburnum prunifolium, L.

Black Haw. Stag-bush.

Southern Connecticut and New York, south to middle Florida and the valley of the Colorado River, Texas; west to Missouri, Arkansas, and the Indian Territory.

A small tree, sometimes 6 to 9 metres in height, with a trunk rarely exceeding 0.15 metre in diameter, or at the north generally reduced to a low, much-branched shrub; rocky hillsides in rich soil.

Wood heavy, very hard, strong, brittle, close-grained, liable to check in drying; medullary rays numerous, very obscure; color brown tinged with red, the sap-wood nearly white.

RUBIACEÆ.

160. Exostema Caribæum, Rœm. & Schultes.

Keys of semi-tropical Florida; in the West Indies.

A small tree, sometimes 7 metres in height, with a trunk 0.20 to 0.30 metre in diameter.

Wood very heavy, exceedingly hard, strong, close-grained, checking in drying, satiny, susceptible of a beautiful polish; medullary rays numerous, very obscure; color light brown beautifully streaked with different shades of yellow and brown, the sap-wood clear rich yellow.

161. Pinckneya pubens, Michx.

Georgia Bark.

South Carolina, near the coast; basin of the upper Apalachicola River in Georgia and Florida.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.30 metre in diameter; borders of streams and low, sandy swamps; rare and local.

Wood light, soft, weak, close-grained, checking badly in drying; layers of annual growth clearly marked by four to six rows of large open ducts; medullary rays few, obscure; color brown, the sap-wood lighter.

Infusions of the bark are successfully used in the treatment of intermittent fever, as a substitute for cinchona.

162. Genipa clusiæfolia, Griseb.

Seven-year Apple.

Southern keys of semi-tropical Florida; in the West Indies.

A small, much-branched, knotty tree, sometimes 6 metres in height,

with a trunk rarely exceeding 0.10 metre in diameter, or in Florida more often a shrub; borders of saline shores.

Wood very heavy, hard, close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, thin; color rich dark brown shaded with orange, the sap-wood light yellow.

163. Guettarda elliptica, Sw.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, 4 to 7 metres in height, with a trunk rarely exceeding 0.20 metre in diameter.

Wood heavy, hard, very close-grained, checking in drying, satiny, susceptible of a beautiful polish, containing numerous scattered small open ducts; medullary rays numerous, thin; color light brown tinged with red.

ERICACEÆ.

164. Vaccinium arboreum, Marsh.

Farkle-berry.

North Carolina, south near the coast to middle Florida, through the Gulf States to Matagorda Bay, Texas, and through Arkansas and southern Missouri to southern Illinois.

A small tree, 7 to 9 metres in height, with a trunk rarely 0.25 metre in diameter, or toward its northern limits often reduced to a low shrub; very common throughout the pine-belt of the Gulf States, along the larger ponds and streams, in moist sandy soil, and reaching its greatest development in eastern Texas near the coast.

Wood heavy, hard, very close-grained, compact, liable to twist in drying, satiny, susceptible of a beautiful polish; medullary rays numerous, broad, conspicuous; color light brown tinged with red, the sap-wood hardly distinguishable; somewhat used in turnery in the manufacture of small handles, etc.

165. Andromeda ferruginea, Walt.

South Carolina to northern Florida, near the coast.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.25 metre in diameter, often crooked or semi-prostrate, rich hummocks; or, in sandy pine-barren soil, reduced to a low shrub, 0.60 to 0.90 metre in height; the leaves varying greatly in shape, venation, etc.

Wood heavy, hard, not strong, very close-grained, checking in drying, satiny, susceptible of a beautiful polish; medullary rays numerous, thin; color bright brown tinged with red, the sap-wood a little lighter.

166. Arbutus Menziesii, Pursh.

Madroña.

Islands of British Columbia, southward through Washington and Oregon, near the coast, and through the Coast Ranges of California to the Santa Lucia Mountains.

A small tree, sometimes 15 to 25 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or rarely much larger; south of San Francisco Bay smaller, often reduced to a low shrub; hillsides in rich soil.

Wood heavy, hard, strong, close-grained, checking in drying; medullary rays numerous, conspicuous; color light brown shaded with red, the sap-wood lighter; largely used in the manufacture of gunpowder, the bark in tanning.

167. Arbutus Xalapensis, HBK.

Southern Arizona, — Santa Rita Mountains, between 4,500 and 7,000 feet elevation; in northern Mexico.

A small tree, 9 to 12 metres in height, with a trunk 0.45 to 0.60 metre in diameter; dry, gravelly slopes; the large specimens generally hollow and defective.

Wood heavy, soft, not strong, brittle, close-grained, checking badly in drying, susceptible of a good polish; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter.

168. Arbutus Texana, Buckley.

Western Texas, Hays and Travis Counties, west to the Guadalupe and Eagle Mountains, and southward, probably into northern Mexico.

A small tree, 5 to 6 metres in height, with a trunk 0.15 to 0.25 metre in diameter; dry limestone hills and ridges; rare and local.

Wood heavy, hard, close-grained, compact; medullary rays numerous, obscure; color brown, the sap-wood lighter, tinged with red; used in turnery, the manufacture of mathematical instruments, etc.

169. Oxydendrum arboreum, DC.

Sorrel Tree. Sour-wood.

Western Pennsylvania, south along the Alleghany Mountains to western Florida and the eastern shores of Mobile Bay, west to middle Tennessee and western Louisiana.

A small tree, 12 to 18 metres in height, with a trunk 0.25 to 0.35 metre in diameter; usually in rather dry, gravelly soil.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, thin; color brown tinged with red, the sap-wood somewhat lighter; used for the handles of tools, bearings of machinery, etc.

170. Kalmia latifolia, L.

Laurel. Calico-bush. Spoonwood. Ivy.

New Brunswick and the northern shores of Lake Erie, south to western Florida, and through the Gulf States to western Louisiana and the valley of the Red River, Arkansas.

A small tree, sometimes 9 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or more often a low shrub; rich woodlands; most common and reaching its greatest development in the southern Alleghany Mountains, here often forming dense, impenetrable thickets.

Wood heavy, hard, strong, brittle, close-grained, compact; principal medullary rays broad, dark brown, conspicuous; intermediate rays numerous, thin, inconspicuous; color brown tinged with red, the sap-wood somewhat lighter; used for tool-handles, in turnery, and for fuel.

171. Rhododendron maximum, L.

Great Laurel. Rose Bay.

Nova Scotia and the north shores of Lake Erie, south through New England, New York, and along the Alleghany Mountains to northern Georgia.

A small tree, sometimes 10 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter, or often a tall, straggling shrub; at the North in cold swamps; rare; very common and reaching its greatest development in the southern Alleghany Mountains, on steep, rocky banks of streams, etc.; never on limestone.

Wood heavy, hard, strong, brittle, close-grained, compact; medullary rays numerous, thin; color light clear brown, the sap-wood lighter; occasionally used in turnery for the handles of tools, etc.; a good substitute for boxwood in engraving.

MYRSINACEÆ.

172. Myrsine Rapanea, Rœm. & Schultes.

Semi-tropical Florida, — Indian River to the southern keys; through the West Indies to Brazil.

A small tree, in Florida rarely exceeding 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or often a shrub; borders of ponds and fresh-water creeks; in the West Indies much larger.

Wood heavy, hard, very close-grained, compact; medullary rays numerous, very conspicuous; color brown tinged with red, and beautifully striped with the darker medullary rays, the sap-wood hardly distinguishable.

173. Ardisia Pickeringia, Nutt.

Marl-berry. Cherry.

Semi-tropical Florida, — Mosquito Inlet to the southern keys, west coast, Caloosa River to Cape Romano; in the West Indies and southern Mexico.

A small tree, sometimes 8 metres in height, with a trunk rarely 0.15 metre in diameter, or often a shrub; reaching its greatest development, in Florida, on the shores of Bay Biscayne.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays very numerous, conspicuous; color rich brown, beautifully marked with the darker medullary rays, the sap-wood a little lighter.

174. Jacquinia armillaris, Jacq.

Joe-wood.

Southern keys of semi-tropical Florida, rare; through the West Indies to Brazil.

A low, rigid tree, rarely exceeding in Florida 4 metres in height, with a trunk sometimes 0.15 metre in diameter; in the West Indies much larger.

Wood heavy, hard, coarse-grained, checking and shrinking badly in drying, containing many scattered large open ducts; medullary rays numerous, broad, conspicuous; color light clear brown tinged with yellow.

The saponaceous leaves are sometimes used as a substitute for soap.

SAPOTACEÆ.

175. Chrysophyllum oliviforme, Lam.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Caloosa River to Cape Sable; rare; through the West Indies to Brazil.

A small tree, sometimes 9 metres in height, with a trunk 0.25 to 0.30 metre in diameter.

Wood very heavy, hard, strong, close-grained, checking in drying; medullary rays numerous, not conspicuous; color light brown shaded with red, the thin sap-wood a little lighter.

176. Sideroxylon Mastichodendron, Jacq.

Mastic.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Cape Romano to Cape Sable; in the West Indies.

A tree often 18 metres in height, with a trunk 0.60 to 0.90 metre in diameter; the largest and most valuable tree of semi-tropical Florida; common.

Wood very heavy, exceedingly hard, strong, close-grained, checking in drying, containing few scattered small open ducts; medullary rays numerous, not conspicuous; color bright orange, the sap-wood yellow; largely used in ship and boat building.

177. Dipholis salicifolia, A. DC.

Bustic. Cassada.

Semi-tropical Florida. — Bay Biscayne to the southern keys; through the West Indies to Brazil.

A tree sometimes 15 metres in height, with a trunk rarely 0.60 metre in diameter; the large specimens hollow and defective; rare.

Wood very heavy, exceedingly hard, very strong, close-grained, compact, checking in drying, susceptible of a beautiful polish, containing many scattered large open ducts; color dark brown or red, the sap-wood lighter.

178. Bumelia tenax, Willd.

North Carolina, southward near the coast to Cape Canaveral and Cedar Keys, Florida.

A small tree, 6 to 9 metres in height, with a trunk sometimes 0.15 metre in diameter; sandy soil.

Wood heavy, hard, not strong, very close-grained, compact, susceptible of a beautiful polish; well characterized, as in all the North American species, by large open ducts, defining, with several rows, the rings of annual growth, connected by conspicuous branching groups of similar ducts; medullary rays numerous, thin; color light brown streaked with white, the sap-wood lighter.

179. Bumelia lanuginosa, Pers.

Gum Elastic. Shittim-wood.

Georgia and northern Florida to Mobile Bay, Alabama; southern Illinois and southern Missouri, through Arkansas to the valley of the Rio Grande, Texas.

An evergreen tree, sometimes 18 metres in height, with a trunk 0.90 metre in diameter, or in the Atlantic States much smaller, rarely exceeding 6 metres in height; common and reaching its greatest development on the rich bottom-lands of eastern Texas.

Wood heavy, soft, weak, close-grained, very compact, the open ducts conspicuous; medullary rays numerous, thin; color light brown or yellow, the sap-wood lighter; somewhat used in cabinet-making.

180. Bumelia spinosa, A. DC.

Arizona, — Santa Catalina Mountains; Parras and Saltillo, Mexico.

A small tree, 6 to 7 metres in height, with a trunk 0.20 to 0.25 metre in diameter; dry, gravelly soil, near water-courses; rare.

Wood heavy, hard, very close-grained, compact, the open ducts conspicuous; medullary rays thin, obscure; color light rich brown or yellow, the sap-wood lighter.

181. Bumelia lycioides, Gærtn. f.

Iron-wood. Southern Buckthorn.

Coast of Virginia and southern Illinois, south to Mosquito Inlet and the Caloosa River, Florida, and through southern Missouri, Arkansas, and Texas to the valley of the Rio Concho.

A small tree, sometimes 9 to 12 metres in height, with a trunk rarely exceeding 0.15 metre in diameter; low, rich soil, or often, in the Atlantic and Gulf States, a low, semi-prostrate shrub (var. *reclinatum*, Gray).

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, thin; color light brown or yellow, the sap-wood lighter.

182. Bumelia cuneata, Sw.

Ant's-wood. Downward Plum. Saffron Plum.

Semi-tropical Florida, — Indian River to the southern keys, not rare, west coast, Cedar Keys to Cape Romano, rare; rocky shores, and in the interior of low, barren keys; Texas, valley of the lower Rio Grande, and southward into northern Mexico; in the West Indies.

A small tree, rarely exceeding 4 metres in height, with a trunk sometimes 0.30 metre in diameter.

Wood heavy, hard, not strong, very close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin; color light brown or orange, the sap-wood lighter.

183. Mimusops Sieberi, A. DC.

Wild Dilly.

Southern keys of semi-tropical Florida, common; in the West Indies.

A small, low, gnarled tree, sometimes 9 metres in height, with a trunk 0.30 to 0.40 metre in diameter; generally hollow and defective.

Wood very heavy, hard, strong, close-grained, inclined to check in drying, susceptible of a beautiful polish; medullary rays numerous, very obscure; color rich, very dark brown, the sap-wood lighter.

EBENACEÆ.

184. Diospyros Virginiana, L.

Persimmon.

Shores of Long Island Sound in Connecticut and New York, and southern Ohio southward to Bay Biscayne and the Caloosa River, Florida, and the valley of the Colorado River, Texas, extending to southeastern Iowa, eastern Kansas, and the Indian Territory.

A tree 10 to 20 or, exceptionally, 30 to 35 metres in height, with a trunk sometimes 0.60 metre in diameter; very common and often entirely occupying abandoned fields in the middle and lower regions of the southern Atlantic and Gulf States, reaching its greatest development on the rich bottom-lands of the lower Ohio basin.

Wood heavy, hard, strong, very close-grained, compact, susceptible of a high polish, containing few scattered open ducts; layers of annual growth marked by one or more rows of similar ducts; medullary rays numerous, conspicuous; color dark brown or often nearly black, the thick sap-wood light brown, often containing numerous darker spots; used in turnery for shoe-lasts, plane-stocks, etc., and preferred for shuttles; the dark heart-wood only developed in very old specimens and rarely seen.

The yellow edible fruit is exceedingly austere until after frost, then becoming sweet and luscious, or in the Gulf States ripening in August without austerity.

A decoction of the bitter and astringent unripe fruit and inner bark is occasionally used in the treatment of diarrhœa, sore throat, hemorrhage, etc.

185. Diospyros Texana, Scheele.

Black Persimmon. Mexican Persimmon. Chapote.

Western Texas, — Matagorda Bay to the valley of the Concho River; in northern Mexico.

A small tree, 4 to 10 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often a low shrub; not rare, and reaching its greatest development, in Texas, on the bottom-lands of the Guadalupe River; borders of prairies, in rich soil; in Mexico more common and of larger size.

Wood heavy, hard, very close-grained, compact, satiny, taking a beautiful polish, containing few minute scattered open ducts; medullary rays numerous, thin; color nearly black, often streaked with yellow, the thick sap-wood clear bright yellow; used in turnery for the handles of tools, etc., suitable for wood-engraving, and probably the best substitute among American woods for boxwood.

The small, black fruit sweet and insipid.

STYRACACEÆ.

186. Symplocos tinctoria, L'Her.

Horse Sugar. Sweet-leaf.

Southern Delaware, south to middle Florida, and west through the Gulf States to western Louisiana and southern Arkansas.

A small tree, 6 to 10 metres in height, with a trunk 0.20 to 0.25 metre in diameter, or often a low shrub; borders of cypress swamps or in deep, damp, shaded woods.

Wood light, soft, not strong, close-grained, checking in drying; medullary rays numerous, thin; color light red or often nearly white, the sap-wood lighter.

The sweet leaves are greedily eaten by cattle and horses, and yield, as well as the bark, a yellow dye.

187. Halesia diptera, L.

Snowdrop Tree. Silver-bell Tree.

South Carolina to northern Florida, near the coast, and west through the lower region of the Gulf States to eastern Texas and central Arkansas.

A small tree, sometimes 6 to 10 metres in height, with a trunk 0.10 to 0.20 metre in diameter, or often a shrub sending up many clustered stems from the root; borders of swamps in low, wet woods.

Wood light, soft, strong, very close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood lighter.

188. Halesia tetraptera, L.

Rattle-box. Snowdrop Tree. Silver-bell Tree. Calico-wood.

Mountains of West Virginia to southern Illinois, south to middle Florida, central Alabama and Mississippi, and through Arkansas to western Louisiana and eastern Texas.

A tree 10 to 15 metres in height, with a trunk rarely 0.60 metre in diameter, or often a tall shrub; generally along streams, in rich soil; most common and reaching its greatest development on the southern Alleghany Mountains.

Wood light, soft, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood lighter.

OLEACEÆ.

189. Fraxinus Greggii, Gray.

Western Texas, — valley of the Rio Grande from the San Pedro to the Pecos River; in northern Mexico.

A small tree, sometimes 7 to 9 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or often a graceful shrub; limestone soil.

Wood heavy, hard, very close-grained, compact; layers of annual growth and medullary rays obscure; color brown, the sap-wood lighter.

190. Fraxinus anomala, Torr.

Southwestern Colorado to southern Utah.

A small tree, sometimes 6 metres in height, with a trunk 0.15 to 0.20 metre in diameter; common on elevated sandstone slopes.

Wood heavy, hard, coarse-grained, containing many large open scattered ducts; layers of annual growth marked by several rows of similar

ducts; medullary rays numerous, thin; color light brown, the sap-wood lighter.

191. Fraxinus pistaciæfolia, Torr.

Ash.

Mountains of western Texas, southern New Mexico, and southern and eastern Arizona, to southern Nevada; in northern Mexico.

A small tree, 10 to 12 metres in height, with a trunk rarely 0.45 metre in diameter; generally along borders of streams, in elevated cañons, less commonly in dry soil, the foliage then thick and coriaceous or, more rarely, velvety tomentose (var. *coriacea*, Gray); the large specimens generally hollow and defective.

Wood heavy, soft, not strong, coarse-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood lighter; occasionally used in wagon-building, for axe handles, etc.

192. Fraxinus Americana, L.

White Ash.

Nova Scotia, New Brunswick, southern Ontario to northern Minnesota, south to northern Florida, central Alabama and Mississippi, and west to eastern Nebraska, Kansas, the Indian Territory, and the valley of the Devil's River, Texas.

A large tree of the first economic value, 15 to 30 or, exceptionally, 42 metres in height, with a trunk 1.20 to 1.80 metres in diameter; low, rich, rather moist soil, reaching its greatest development on the bottom-lands of the lower Ohio River Basin; toward its western and southwestern limits smaller, of less economic value, and generally replaced by the green ash (*Fraxinus viridis*). The form of western Texas (var. *Texensis*, Gray), with smaller fruit, and generally 5 short, ovate leaflets, is a small tree, with harder, heavier, and more compact wood.

Wood heavy, hard, strong, ultimately brittle, coarse-grained, compact; layers of annual growth clearly marked by several rows of large open ducts, which in slowly grown specimens occupy nearly the entire width of the annual rings; medullary rays numerous, obscure; color brown, the sap-wood much lighter, often nearly white; largely used in the manufacture of agricultural implements, carriages, handles, oars, and for interior and cabinet work.

193. Fraxinus pubescens, Lam.

Red Ash.

New Brunswick to southern Ontario and northern Minnesota, south to northern Florida and central Alabama.

A tree 12 to 15 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; borders of streams and swamps, in low ground; common and reaching its greatest development in the north Atlantic States;

rare west of the Alleghany Mountains, probably not extending west of the Mississippi River.

Wood heavy, hard, strong, brittle, coarse-grained, compact; medullary rays numerous, thin; color rich brown, the sap-wood light brown streaked with yellow; somewhat used as a substitute for the more valuable white ash, with which it is often confounded.

194. Fraxinus viridis, Michx. f.

Green Ash.

Shores of Lake Champlain, Rhode Island and southward to northern Florida, west to the valley of the Saskatchewan, the eastern ranges of the Rocky Mountains of Montana, the Wahsatch Mountains of Utah, and the ranges of eastern and northern Arizona.

A tree 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; borders of streams or in low, rather moist soil; at the West confined to the bottom-lands of the large streams and to high mountain cañons. A form with 3 to 5 leaflets, common in Texas west of the Colorado River and extending into Mexico, is var. *Berlandieriana*, Torr.

Wood heavy, hard, strong, brittle, rather coarse-grained, compact, satiny, containing numerous scattered small open ducts, the layers of annual growth marked by several rows of larger ducts; medullary rays numerous, obscure; color brown, the sap-wood lighter.

195. Fraxinus platycarpa, Michx.

Water Ash.

Southeastern Virginia, south near the coast to Cape Canaveral and the Caloosa River, Florida, west through the Gulf States to the valley of the Sabine River, Texas, and the Washita River, southwestern Arkansas; in the West Indies.

A small tree, 9 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; deep river swamps.

Wood very light, soft, not strong, brittle, close-grained, compact, the open ducts not conspicuous; medullary rays few, obscure; color nearly white or sometimes tinged with yellow, the sap-wood lighter.

196. Fraxinus quadrangulata, Michx.

Blue Ash.

Southern Michigan to central Minnesota, south to northern Alabama, and through Iowa and Missouri to northeastern Arkansas.

A tree 18 to 25 or, exceptionally, 37 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; generally on limestone hills, rarely extending to bottom-lands, and reaching its greatest development in the basin of the lower Wabash River.

Wood heavy, hard, not strong, brittle, close-grained, compact, satiny; layers of annual growth clearly marked by one to three rows of large

open ducts; medullary rays numerous, obscure; color light yellow streaked with brown, the sap-wood lighter; largely used for flooring, in carriage-building, etc.

197. Fraxinus Oregana, Nutt.

Oregon Ash.

Shores of Puget Sound, south through Washington and Oregon west of the eastern valleys of the Cascade Mountains, along the California Coast Ranges to San Francisco Bay and the western slopes of the Sierra Nevada to the San Bernardino and Hot Spring Mountains, California.

A tree sometimes 24 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; moist soil, generally along streams, and reaching its greatest development on the bottom-lands of southwestern Oregon.

Wood light, hard, not strong, brittle, coarse-grained, compact, containing many large open scattered ducts, the layers of annual growth strongly marked with several rows of similar ducts; medullary rays numerous, thin; color brown, the sap-wood lighter; used in the manufacture of furniture, for the frames of carriages and wagons, in cooperage, for fuel, etc.

198. Fraxinus sambucifolia, Lam.

Black Ash. Hoop Ash. Ground Ash.

Southern Newfoundland and northern shores of the Gulf of Saint Lawrence, southwesterly to the eastern shores of Lake Winnipeg, south through the northern States to northern Delaware, the mountains of Virginia, southern Illinois, and northwestern Arkansas.

A tree 25 to 30 metres in height, with a trunk 0.30 to 0.60 metre in diameter; swamps and low river banks.

Wood heavy, soft, not strong, tough, rather coarse-grained, compact, durable, separating easily into thin layers; layers of annual growth strongly marked by several rows of large open ducts; medullary rays numerous, thin; color dark brown, the sap-wood light brown or often nearly white; largely used for interior finish, fencing, barrel-hoops, in cabinet-making, and the manufacture of baskets.

199. Forestiera acuminata, Poir.

Privet.

Southwestern Georgia, western Florida, through the Gulf States to the valley of the Colorado River, Texas, and northward through Arkansas to southern Missouri and southwestern Illinois.

A small tree, 6 to 8 metres in height, with a trunk rarely 0.20 metre in diameter; borders of swamps and streams, in low, wet soil; common in the Gulf region, near the coast, and reaching its greatest development in southern Arkansas.

Wood heavy, soft, not strong, brittle, close-grained, compact; medullary rays numerous, thin, rather conspicuous; color light yellow streaked with brown; the sap-wood lighter.

200. Chionanthus Virginica, L.

Fringe Tree. Old Man's Beard.

Southeastern Pennsylvania, south to Tampa Bay, Florida, and through the Gulf States to southern Arkansas and the valley of the Brazos River, Texas.

A small tree, 6 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter; generally along streams, in low, rich soil.

Wood heavy, hard, close-grained, compact; layers of annual growth marked by several rows of large open ducts, connected as in that of *Bumelia* by branching groups of similar ducts; medullary rays numerous, obscure; color light brown, the sap-wood lighter.

A decoction of the tonic and anti-periodic bark of the root is sometimes employed in the treatment of intermittent fevers.

201. Osmanthus Americanus, Benth. & Hook.

Devil-wood.

Southern Virginia, south to Cape Canaveral and Tampa Bay, Florida, and through the Gulf States to eastern Louisiana, near the coast.

A small tree, 10 to 15 metres in height, with a trunk sometimes 0.30 metre in diameter; borders of streams and pine-barren swamps, in moist, rich soil.

Wood heavy, very hard and strong, close-grained, unwedgeable, difficult to work, containing many radiating groups of open cells parallel to the thin obscure medullary rays; color dark brown, the thick sap-wood light brown or yellow.

BORRAGINACEÆ.

202. Cordia Sebestena, L.

Geiger Tree.

Southern keys of semi-tropical Florida; rare; in the West Indies.

A small tree, sometimes 8 metres in height, with a trunk 0.06 to 0.08 metre in diameter; rich hummock soil.

Wood heavy, hard, close-grained, compact, satiny, containing few scattered small open ducts; medullary rays very numerous, thin, conspicuous; color dark brown, the thick sap-wood light brown or yellow.

203. Cordia Boissieri, A. DC.

Texas, — valley of the Rio Grande, westward to New Mexico; in northern Mexico.

A small tree, rarely 8 metres in height, with a trunk 0.12 to 0.15 metre in diameter, or more often reduced to a low shrub.

Wood light, rather soft, close-grained, compact, containing many small scattered open ducts; medullary rays very numerous, thin, conspicuous; color dark brown, the sap-wood light brown.

204. Bourreria Havanensis, Miers.

Strong Back.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, 10 or, exceptionally, 15 metres in height, with a trunk 0.20 to 0.25 metre in diameter; the large specimens generally hollow and defective. A form (generally shrubby in Florida) with scabrous or hispidulous leaves is var. *radula*, Gray.

Wood heavy, very hard, strong, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, obscure; color brown streaked with orange, the sap-wood not distinguishable.

205. Ehretia elliptica, DC.

Knack-away. Anaqua.

Texas, — Corpus Christi to New Braunfels, and southward to the valley of the lower Rio Grande.

A tree 10 to 15 metres in height, with a trunk sometimes 0.50 metre in diameter; borders of streams, in rich loam, and reaching its greatest development between the Guadalupe and Nueces Rivers.

Wood heavy, hard, not strong, very close-grained, compact, unwedgeable, containing many small open ducts arranged in numerous concentric rings within the layers of annual growth, these marked by several rows of larger ducts; medullary rays numerous, thin; color light brown, the sap-wood a little lighter.

BIGNONIACEÆ.

206. Catalpa bignonioides, Walt.

Catalpa. Catawba. Bean Tree. Cigar Tree. Indian Bean.

Southwestern Georgia, western Florida, and through central Alabama and Mississippi.

A low, much-branched tree, 12 to 15 metres in height, with a trunk 0.50 to 0.75 metre in diameter; borders of streams and swamps, in rich loam; rare and local; long cultivated for ornament, and now extensively naturalized in the middle and southern Atlantic States.

Wood light, soft, not strong, coarse-grained, compact, very durable in contact with the soil; layers of annual growth clearly marked by many rows of large open ducts; medullary rays numerous, obscure; color light brown, the thin sap-wood lighter, often nearly white; used and highly valued for fence-posts, rails, etc.

207. Catalpa speciosa, Warder.

Western Catalpa.

Southern Illinois and Indiana, western Kentucky and Tennessee to southeastern Missouri and western Arkansas.

A tree 20 to 35 or, exceptionally, 45 metres in height, with a trunk 1 to 2 metres in diameter; borders of streams and swamps, on rich bottom-lands; common and reaching its greatest development in the valley of the lower Wabash River; cultivated and now widely naturalized in southern Arkansas, western Louisiana, and eastern Texas.

Wood light, soft, not strong, coarse-grained, compact, very durable in contact with the soil; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, obscure; color brown, the thin sap-wood lighter; largely used for railway-ties, fence-posts, rails, etc., and adapted for cabinet work and interior finish.

208. Chilopsis saligna, D. Don.

Desert Willow.

Valley of the Rio Grande, Texas, and west through southern New Mexico and Arizona to southern California; in northern Mexico.

A small tree, 6 to 8 metres in height, with a trunk sometimes 0.30 metre in diameter; slopes and banks of depressions and water-courses in the desert; the large specimens generally hollow and defective.

Wood light, soft, not strong, close-grained, checking in drying, containing many scattered small open ducts; the layers of annual growth marked by several rows of larger ducts; medullary rays numerous, obscure; color brown streaked with yellow, the sap-wood much lighter.

209. Crescentia cucurbitina, L.

Black Calabash-tree.

Semi-tropical Florida, — near Miami, and on Little River; in the West Indies.

A small tree, in Florida rarely exceeding 6 metres in height, with a trunk 0.10 to 0.12 metre in diameter.

Wood heavy, hard, very close-grained, compact, containing many small regularly distributed open ducts; medullary rays thin, hardly distinguishable; color light brown tinged with orange, the sap-wood lighter.

VERBENACEÆ.

210. Citharexylum villosum, Jacq.

Fiddle-wood.

Semi-tropical Florida, — Cape Canaveral to the southern keys; in the West Indies and Mexico.

A small tree, rarely exceeding in Florida 6 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or north of Bay Biscayne reduced to a low much-branched shrub; common and reaching, within the United States, its greatest development on the shores of Bay Biscayne, Lost Man's River, etc.

Wood heavy, exceedingly hard, strong, close-grained, compact, susceptible of a fine polish, containing numerous small regularly distributed open ducts; color clear bright red, the sap-wood lighter.

211. Avicennia nitida, Jacq.

Black Mangrove. Black Tree. Black-wood.

Florida coast, — Saint Augustine to the southern keys, and Cedar Keys to Cape Sable; deltas of the Mississippi River; through the West Indies to Brazil.

A tree 6 to 9 metres in height, with a trunk 0.25 to 0.30 metre in diameter, or, exceptionally, 20 to 23 metres in height, with a trunk 0.60 metre in diameter; north of Mosquito Inlet reduced to a low shrub; common along saline shores and swamps, throwing up many leafless corky stems, and forming, with the red mangrove (*Rhizophora*), impenetrable thickets, or, more rarely, scattered and round-headed; reaching its greatest development, in the United States, on the west coast of Florida, north of Cape Sable.

Wood very heavy, hard, rather coarse-grained, compact; the eccentric layers of annual growth marked by several rows of large open ducts; medullary rays numerous, thin; color dark brown or nearly black, the sap-wood brown.

NYCTAGINACEÆ.

212. Pisonia obtusata, Sw.

Pigeon-wood. Beef-wood. Cork-wood. Pork-wood.

Semi-tropical Florida, — Cape Canaveral to the southern keys; in the West Indies.

A tree 9 to 15 metres in height, with a trunk 0.25 to 0.45 metre in diameter; saline shores and beaches.

Wood heavy, rather soft, weak, coarse-grained, compact, containing numerous large open ducts; layers of annual growth and medullary rays hardly distinguishable; color yellow tinged with brown, the sap-wood darker.

POLYGONACEÆ.

213. Coccoloba Floridana, Meisn.

Pigeon Plum.

Semi-tropical Florida, — Cape Canaveral to the southern keys, and from Cape Romano to Cape Sable.

A tree 15 to 18 metres in height, with a trunk 0.30 to 0.60 metre in diameter; one of the largest and most common trees of the region.

Wood very heavy, exceedingly hard, strong, brittle, very close-grained, inclined to check in drying, containing few small scattered open ducts; layers of annual growth and numerous medullary rays obscure; color rich dark brown tinged with red, the sap-wood lighter; valuable and somewhat used in cabinet-making.

214. Coccoloba uvifera, Jacq.

Sea Grape.

Semi-tropical Florida, — Mosquito Inlet to the southern keys, west coast, Tampa Bay to Cape Sable; through the West Indies to Brazil.

A low tree, rarely exceeding in Florida 4 metres in height, with a gnarled, contorted trunk often 0.90 to 1.20 metres in diameter, or reduced to a low, generally prostrate shrub; saline shores and beaches; common.

Wood very heavy, hard, very close-grained, inclined to check in drying, susceptible of a beautiful polish, containing few scattered rather small open ducts; layers of annual growth and numerous medullary rays hardly distinguishable; color rich dark brown or violet, the sap-wood lighter; valuable for cabinet-making.

LAURACEÆ.

215. Persea Carolinensis, Nees.

Red Bay.

Virginia south to Bay Biscayne and Cape Romano, Florida, and through the Gulf States to southern Arkansas and the valley of the Trinity River, Texas, near the coast.

A tree 15 to 20 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams and swamps, in low, rich soil. A form found near the coast from North Carolina to Alabama, well characterized by its longer flower-stalks densely covered, as well as the young shoots and under sides of the leaves, with a dense short brown tomentum, the wood orange-colored streaked with brown, is var. *palustris*, Chapm.

Wood heavy, hard, very strong, brittle, very close-grained, compact, susceptible of a beautiful polish, containing many evenly distributed open ducts; medullary rays numerous, thin; color bright red, the sap-wood much lighter; formerly somewhat used in ship-building, interior finish, and for cabinet work.

216. Nectandra Willdenoviana, Nees.

Lancewood.

Semi-tropical Florida, — Cape Canaveral and Cape Romano to the southern keys; in the West Indies and Central America.

A small tree, 6 to 9 metres in height, with a trunk rarely exceeding 0.15 metre in diameter; common and reaching its greatest development, in Florida, on the shores of Bay Biscayne and in the neighborhood of Cape Romano.

Wood heavy, hard, close-grained, checking in drying, containing many small regularly distributed open ducts; medullary rays numerous, thin; color rich dark brown, the sap-wood bright yellow.

217. Sassafras officinale, Nees.

Sassafras.

Eastern Massachusetts to southwestern Vermont, and west through southern Ontario and central Michigan to southeastern Iowa, eastern Kansas, and the Indian Territory; south to middle Florida, and the valley of the Brazos River, Texas.

A tree 12 to 15 metres in height, with a trunk 0.60 to 0.90 metre in diameter, exceptionally, 24 to 27 metres in height, with a trunk 1.80 to 2.25 metres in diameter, or toward its northern limits reduced to a small tree or shrub; rich, sandy loam, reaching its greatest development in southwestern Arkansas and the Indian Territory.

Wood light, soft, not strong, brittle, coarse-grained, very durable in contact with the soil, slightly aromatic, checking in drying; layers of annual growth clearly marked with three or four rows of large open ducts; medullary rays numerous, thin; color dull orange-brown, the thin sap-wood light yellow; used for light skiffs, ox-yokes, etc., and largely for fence posts and rails, and in cooperage.

The root, and especially its bark, enters into commerce, affording a powerful aromatic stimulant.

218. Umbellularia Californica, Nutt.

Mountain Laurel. California Laurel. Spice Tree. Cagiput. California Olive. California Bay-tree.

Southwestern Oregon, south through the California Coast Ranges, and along the western slopes of the Sierra Nevada Mountains.

An evergreen tree, 24 to 30 metres in height, with a trunk 1.20 to 1.80 metres in diameter, or toward its southern limits and at high elevations a small tree or shrub; most common and reaching its greatest development in the rich valleys of southwestern Oregon.

Wood heavy, hard, strong, close-grained, compact, susceptible of a beautiful polish, containing numerous small regularly distributed open ducts; medullary rays numerous, thin; color rich light brown, the sap-wood lighter; used on the Oregon coast in ship-building, for jaws, bitts, cleats, cross-trees, etc., and the most valuable material produced in the Pacific forests for interior and cabinet work.

EUPHORBIACEÆ.

219. Drypetes crocea, Poit.

Guiana Plum. White-wood.

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A small tree, sometimes 9 metres in height, with a trunk 0.12 to 0.17 metre in diameter. A little-known form (var. *latifolia*, Müll.) with whitish warty branches, the calyx 5-parted, and more coriaceous leaves, should perhaps be considered a distinct species (*D. glauca*, Nutt.).

Wood heavy, hard, not strong, brittle, close-grained, checking in drying; medullary rays numerous, thin; color rich dark brown, the sap-wood yellow.

220. Sebastiania lucida, Müll.

Crab-wood. Poison-wood.

Semi-tropical Florida, — Bay Biscayne to the southern keys; common; in the West Indies.

A small tree, sometimes 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter; the large specimens generally hollow and decayed.

Wood very heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, obscure; color rich dark brown streaked with yellow, the sap-wood bright yellow; now largely manufactured into canes and furnishing valuable fuel.

221. Hippomane Mancinella, L.

Manchineel.

Southern keys of semi-tropical Florida; common; in the West Indies and Central America.

A small tree, in Florida rarely exceeding 4 metres in height, with a trunk 0.12 to 0.17 metre in diameter; abounding in white milky exceedingly caustic poisonous sap.

Wood light, soft, close-grained, compact, containing numerous evenly distributed small open ducts; medullary rays numerous, obscure; color dark brown, the thick sap-wood light brown or yellow.

URTICACEÆ.

222. Ulmus crassifolia, Nutt.

Cedar Elm.

Southern Arkansas, and Texas to the valley of the Rio Grande.

A tree 18 to 20 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or toward its southern or southwestern limits much smaller;

borders of streams, in rich soil; one of the most common and valuable timber-trees of Texas west of the Trinity River, and reaching its greatest development in the valleys of the Guadalupe and Trinity Rivers.

Wood heavy, hard, not strong, brittle, very close-grained, compact; layers of annual growth and medullary rays obscure; marked, in common with that of all the North American species, by concentric circles of irregularly arranged groups of small open ducts; color light brown tinged with red, the heavier sap-wood lighter; used in the manufacture of wagon-hubs, saddle-trees, chairs, etc., and very largely for fencing.

223. Ulmus fulva, Michx.

Red Elm. Slippery Elm. Moose Elm.

Valley of the lower Saint Lawrence River to northern Dakota, south to northern Florida, central Alabama and Mississippi, and the valley of the San Antonio River, Texas.

A tree 15 to 20 metres in height, with a trunk 0.45 to 0.60 metre in diameter; borders of streams and hillsides in rich soil.

Wood heavy, hard, strong, very close-grained, compact, durable in contact with the ground, splitting readily when green; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, thin; color dark brown or red, the thin sap-wood lighter; largely used for wheel-stock, fence-posts, rails, railway-ties, sills, etc.

The inner bark mucilaginous, nutritious, and extensively used in various medicinal preparations.

224. Ulmus Americana, L.

White Elm. American Elm. Water Elm.

Southern Newfoundland to the northern shores of Lake Superior and the eastern slope of the Rocky Mountains, in about latitude 52° N.; south to Cape Canaveral and Pease Creek, Florida, extending west in the United States to the Black Hills of Dakota, central Nebraska, the Indian Territory, and the valley of the Rio Concho, Texas.

A large tree, 30 to 35 metres in height, with a trunk 1.80 to 2.70 metres in diameter; rich, moist soil, borders of streams, etc.; toward its western and southwestern limits only on bottom-lands.

Wood heavy, hard, strong, tough, rather coarse-grained, compact, difficult to split; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, thin; color light brown, the sap-wood somewhat lighter; largely used for wheel-stock, saddle-trees, flooring, in cooperage, and in boat and ship building.

225. Ulmus racemosa, Thomas.

Rock Elm. Cork Elm. Hickory Elm. White Elm. Cliff Elm.

Southwestern Vermont, through western New York, Ontario, and southern Michigan to northeastern Iowa, and south through Ohio to central Kentucky.

A large tree, 20 to 30 metres in height, with a trunk sometimes 0.90 metre in diameter; low, wet clay, rich uplands or rocky declivities and river cliffs; common and reaching its greatest development in southern Ontario and the southern peninsula of Michigan.

Wood heavy, hard, very strong, tough, very close-grained, compact, susceptible of a beautiful polish; layers of annual growth marked with one or two rows of small open ducts; medullary rays numerous, obscure; color light clear brown often tinged with red, the thick sap-wood much lighter; largely used in the manufacture of heavy agricultural implements, wheel-stock, and for railway-ties, bridge-timbers, sills, etc.

226. Ulmus alata, Michx.

Wahoo. Winged Elm.

Southern Virginia, south through the middle districts to western Florida, through the Gulf States to the valley of the Trinity River, Texas, extending north through the eastern portions of the Indian Territory, Arkansas, and southern Missouri to southern Indiana and Illinois.

A small tree, 7 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter; generally in dry, gravelly soil, or rarely along the borders of swamps and bottom-lands; most common and reaching its greatest development in southern Missouri and Arkansas.

Wood heavy, hard, not strong, very close-grained, compact, unwedgeable; medullary rays distant, not conspicuous; color brown, the sap-wood lighter largely used for hubs, blocks, etc.

227. Planera aquatica, Gmel.

Valley of the Cape Fear River, North Carolina, south to western Florida, and through central Alabama and Mississippi to western Louisiana and the valley of the Trinity River, Texas, extending north through Arkansas and southern Missouri to central Kentucky and southern Illinois.

A small tree, 9 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter; cold, deep, inundated river-swamps; rare in the Atlantic and eastern Gulf States; very common and reaching its greatest development in western Louisiana and southern Arkansas.

Wood light, soft, not strong, close-grained, compact, containing few scattered open ducts; medullary rays numerous, thin; color light brown, the sap-wood nearly white.

228. Celtis occidentalis, L.

Sugar-berry. Hackberry.

Valley of the Saint Lawrence River, west to eastern Dakota, south through the Atlantic region to Bay Biscayne and Cape Romano, Florida, and the valley of the Devil's River, Texas.

A large tree, 18 to 30 or, exceptionally, 36 to 39 metres in height, with a trunk 0.60 to 1.50 metres in diameter; most common and reaching its greatest development in the Mississippi River basin; rich bottoms or dry hillsides; sometimes reduced to a low shrub (*C. pumila*), and varying greatly in the size, shape, and texture of the leaves (*C. Mississippiensis lævigata, integrifolia, crassifolia*, etc.); the extremes connected by innumerable intermediate forms, which, thus considered, make one polymorphous species of wide geographical range. A form with small thick coriaceous leaves with prominent reticulated veins, found from western Texas to southern California, and through the Rocky Mountains to eastern Oregon is var. *reticulata*, Sargent.

Wood heavy, rather soft, not strong, coarse-grained, compact, satiny, susceptible of a good polish; layers of annual growth clearly marked by several rows of large open ducts, containing many small groups of smaller ducts arranged in intermediate concentric rings; medullary rays numerous, thin; color clear light yellow, the sap-wood lighter; largely used for fencing and occasionally in the manufacture of cheap furniture.

229. Ficus aurea, Nutt.

Semi-tropical Florida, — Indian River to the southern keys.

A large parasitic tree, germinating on the trunks and branches of other trees, and sending down to the ground long aerial roots, which gradually grow together, kill the enclosed tree, and form a trunk sometimes 0.90 to 1.20 metres in diameter.

Wood exceedingly light, soft, very weak, coarse-grained, compact, not durable; medullary rays thin, hardly distinguishable; color light brown, the sap-wood lighter.

230. Ficus brevifolia, Nutt.

Semi-tropical Florida, — Bay Biscayne to the southern keys.

A tree sometimes 15 metres in height, with a trunk rarely exceeding 0.30 metre in diameter.

Wood light, soft, close-grained, compact, containing few large open scattered ducts, and many groups of much smaller ducts arranged in concentric circles; medullary rays numerous, thin, conspicuous; color light brown or yellow, the sap-wood lighter.

231. Ficus pedunculata, Ait.

Wild Fig. India-rubber Tree.

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A tree sometimes 12 metres in height, with a trunk rarely exceeding 0.50 metre in diameter; often branched from the ground; rare.

Wood light, soft, weak, close-grained, compact, containing many large open scattered ducts, with many groups of small ducts arranged in con-

centric circles; medullary rays numerous, obscure; color light orange brown, the sap-wood undistinguishable.

232. Morus rubra, L.

Red Mulberry.

Western New England and Long Island, New York, west through southern Ontario and central Michigan to the Black Hills of Dakota, eastern Nebraska and Kansas; south to Bay Biscayne and Cape Romano, Florida, and the valley of the Colorado River, Texas.

A large tree, 18 to 20 metres in height, with a trunk 0.90 to 1.20 metres in diameter; generally on rich bottom-lands; most common and reaching its greatest development in the basins of the lower Ohio and the Mississippi Rivers.

Wood light, soft, not strong, rather tough, coarse-grained, compact, very durable in contact with the soil, satiny, susceptible of a good polish; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, thin; color light orange-yellow, the sap-wood lighter; largely used in fencing, cooperage, for snaths, and at the South in ship and boat building.

The large dark purple fruit sweet and edible.

233. Morus microphylla, Buckley.

Mexican Mulberry.

Valley of the Colorado River, through western Texas to the valley of the Gila River, New Mexico; in northern Mexico.

A small tree, sometimes 7 metres in height, with a trunk rarely 0.30 metre in diameter, or often reduced to a low shrub; most common and reaching its greatest development in the mountain cañons of southern New Mexico.

Wood heavy, hard, close-grained, compact; layers of annual growth marked by several rows of small open ducts; medullary rays numerous, thin; color orange or, rarely, dark brown, the sap-wood light yellow.

The small acid fruit hardly edible.

234. Maclura aurantiaca, Nutt.

Osage Orange. Bois d'Arc.

Southwestern Arkansas, southeastern portions of the Indian Territory, and southward into northern Texas.

A tree sometimes 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; rich bottom-lands; most common and reaching its greatest development along the valley of the Red River in the Indian Territory; extensively planted for hedges, especially in the Western States.

Wood heavy, exceedingly hard, very strong, flexible, close-grained, compact, very durable in contact with the ground, satiny, susceptible of a beautiful polish, containing numerous small open ducts; layers of annual growth clearly marked with broad bands of larger ducts; medullary rays thin, numerous, conspicuous; color bright orange, turning brown with exposure, the sap-wood light yellow; largely used for fence-posts, paving-blocks, railway-ties, and wheel-stock.

PLATANACEÆ.

235. Platanus occidentalis, L.

Sycamore. Buttonwood. Button-ball Tree. Water Beech.

Southern Maine and southeastern New Hampshire to northern Vermont and the northern shores of Lakes Ontario and Erie, west to eastern Nebraska and Kansas; south to northern Florida, central Alabama, and Mississippi, and southwest to the valley of the Devil's River, Texas.

The largest tree of the Atlantic forests, often 30 to 40 metres in height, with a trunk 2.40 to 4.20 metres in diameter; borders of streams and bottom-lands, in rich, moist soil; very common and reaching its greatest development in the valleys of the Ohio and Mississippi Rivers; the large specimens generally hollow.

Wood heavy, hard, not strong, very close-grained, compact, difficult to split and work; layers of annual growth clearly marked by broad bands of small ducts; the numerous medullary rays very conspicuous, as in that of all the North American species; color brown tinged with red, the sap-wood lighter; largely used for tobacco boxes, ox-yokes, butchers' blocks, and, rarely, in the manufacture of cheap furniture.

236. Platanus racemosa, Nutt.

Sycamore. Buttonwood.

California, — valley of the Sacramento River, south through the interior valleys and Coast Ranges to the southern boundary of the State.

A large tree, 24 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter; borders of streams, in rich soil.

Wood light, soft, not strong, very close-grained, compact, difficult to split; layers of annual growth clearly marked by narrow bands of small ducts; medullary rays numerous, conspicuous; color light brown tinged with red, the sap-wood lighter.

237. Platanus Wrightii, Watson.

Sycamore.

Valleys of southwestern New Mexico to the valley of the San Pedro River, Arizona; in northern Mexico.

A tree sometimes 15 to 18 metres in height, with a trunk 0.45 to 0.60 metre in diameter; banks of streams and high mountain cañons.

Wood light, soft, weak, very close-grained, compact; layers of annual growth clearly marked by several rows of open ducts; medullary rays numerous, thin, very conspicuous; color light brown tinged with red, the sap-wood lighter.

JUGLANDACEÆ.

238. Juglans cinerea, L.

Butternut. White Walnut.

Southern New Brunswick, valley of the Saint Lawrence River, Ontario and southern Michigan to northern Minnesota and central Iowa; south to Delaware, and along the Alleghany Mountains to northern Georgia, central Alabama and Mississippi, northern Arkansas, and southeastern Kansas.

A tree 18 to 24 or, exceptionally, 30 to 35 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich woodlands; rare at the south; most common and reaching its greatest development in the Ohio River basin.

Wood light, soft, not strong, rather coarse-grained, compact, easily worked, satiny, susceptible of a beautiful polish, containing numerous regularly distributed large open ducts; medullary rays distant, thin, obscure; color bright light brown, turning dark with exposure, the sap-wood lighter; largely used for interior finish, cabinet work, etc.

The inner bark, especially that of the root, is employed medicinally as a mild cathartic, and furnishes a yellow dye.

239. Juglans nigra, L.

Black Walnut.

Western Massachusetts, west along the southern shores of Lake Erie through southern Michigan to southern Minnesota, eastern Nebraska, and eastern Kansas, south to western Florida, central Alabama and Mississippi, and the valley of the San Antonio River, Texas.

A large tree, often 30 to 45 metres in height, with a trunk 1.80 to 3 metres in diameter; rich bottom-lands and hillsides; most common and reaching its greatest development on the western slopes of the southern Alleghany Mountains and in the rich bottoms of southwestern Arkansas and the Indian Territory; less common east of the Alleghany Mountains, and now everywhere scarce.

Wood heavy, hard, strong, rather coarse-grained, liable to check if not carefully seasoned, easily worked, susceptible of a beautiful polish, durable in contact with the soil, containing numerous large regularly distributed open ducts; medullary rays numerous, thin, not conspicuous; color rich

dark brown, the thin sap-wood much lighter; more generally used in cabinet-making, interior finish, and for gun-stocks, than that of any other North American tree.

240. Juglans rupestris, Engelm.

Walnut.

Valley of the upper Colorado River, west through western Texas, southern New Mexico and Arizona, between 5,000 and 7,000 feet elevation, and in the California Coast Ranges from the San Bernardino Mountains to San Francisco Bay and the valley of the Sacramento River.

A tree rarely 15 to 22 metres in height, with a trunk 0.30 to 0.90 metre in diameter, reaching its greatest development near its northern limits in California; in Texas generally reduced to a low, much-branched shrub; borders of streams and mountain cañons, in rich soil.

Wood heavy, hard, not strong, coarse-grained, checking in drying, susceptible of a good polish, containing numerous regularly distributed large open ducts; medullary rays distant, thin, obscure; color rich dark brown, the sap-wood lighter.

The small nuts sweet and edible.

241. Carya olivæformis, Nutt.

Pecan. Illinois Nut.

Southeastern Iowa, southern Illinois and Indiana, northwestern Kentucky, south and southwest through Missouri and Arkansas to eastern Kansas, the Indian Territory, western Louisiana, and Texas to the valley of the Concho River.

A tree 30 to 52 metres in height, with a trunk 0.90 to 1.80 metres in diameter; borders of streams, in low, rich soil; very common and reaching its greatest development on the bottom-lands of Arkansas and the Indian Territory; the largest species of the genus, and the largest and most important tree of western Texas.

Wood heavy, hard, not strong, brittle, close-grained, compact; layers of annual growth marked by one or two rows of large open ducts; medullary rays numerous, thin; color light brown tinged with red; the sap-wood lighter brown; less valuable than the wood of the other species, and hardly used except for fuel.

The sweet edible nuts are collected in great quantities, affording an important article of commerce.

242. Carya alba, Nutt.

Shell-bark Hickory. Shag-bark Hickory.

Valley of the Saint Lawrence River, northern shores of Lakes Ontario and Erie to southern Michigan and southeastern Minnesota, south to western Florida, central Alabama and Mississippi, and west to eastern Kansas, the Indian Territory, and eastern Texas.

A large tree, 24 to 30 or, exceptionally, 39 to 45 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rich hillsides and sandy ridges; common, and reaching its greatest development west of the Alleghany Mountains; varying greatly in the size and shape of the fruit. A form with small, thin-shelled nuts (*C. microcarpa*, Nutt.) is not rare from Delaware southward, and in Michigan.

Wood heavy, very hard and strong, tough, close-grained, compact, flexible; layers of annual growth clearly marked with one to three rows of large open ducts; medullary rays numerous, thin; color brown, the thin and more valuable sap-wood nearly white; largely used in the manufacture of agricultural implements, carriages, axe-handles, baskets, etc.

The sweet and edible nuts afford an important article of commerce.

243. Carya sulcata, Nutt.

Big Shell-bark. Bottom Shell-bark.

Chester County, Pennsylvania, west to southern Indiana and Illinois, eastern Kansas, and the Indian Territory.

A tree 24 to 30 or, exceptionally, 37 metres in height, with a trunk 0.60 to 1.20 metres in diameter; bottom-lands, in low, rich soil; rare and local; most common and reaching its greatest development in southern Arkansas and the Indian Territory.

Wood heavy, very hard, strong and tough, very close-grained, compact, flexible; layers of annual growth marked by one or two rows of large open ducts; medullary rays numerous, obscure; color dark brown, the sap-wood nearly white; used for the same purposes as that of the shell-bark hickory.

The large nuts sweet and edible.

244. Carya tomentosa, Nutt.

Mocker-nut. Black Hickory. Bull-nut. Big-bud Hickory. White-heart Hickory. King nut.

Valley of the Saint Lawrence River, northern shores of Lakes Ontario and Erie to eastern Nebraska, eastern Kansas, and the Indian Territory, south to Cape Canaveral and Tampa Bay, Florida, and the valley of the Brazos River, Texas.

A tree 24 to 33 metres in height, with a trunk 0.90 to 1.20 metres in diameter; generally on rich hillsides; less commonly on low, river bottom-lands; very common in the Gulf States, and the most generally distributed species of the genus in the South.

Wood heavy, very hard, strong, tough, very close-grained, checking in drying, flexible, containing few large regularly distributed open ducts; medullary rays numerous, thin, obscure; color rich dark brown, the thick sap-wood nearly white; used for the same purposes as that of the shell-bark hickory.

245. Carya porcina, Nutt.

Pig-nut. Brown Hickory. Black Hickory. Switch-bud Hickory.

Southern Maine to southern Ontario, southern Michigan and Minnesota to eastern Nebraska, eastern Kansas, and the Indian Territory, south to Cape Canaveral and Pease Creek, Florida, and the valley of the Nueces River, Texas.

A tree 24 to 40 metres in height, with a trunk 0.90 to 1.50 metres in diameter; dry hills and uplands; common.

Wood heavy, hard, very strong and tough, flexible, close-grained, checking in drying, containing many large open ducts; color dark or light brown, the thick sap-wood lighter, often nearly white; used for the same purposes as that of the shell-bark hickory.

246. Carya amara, Nutt.

Bitter-nut. Swamp Hickory.

Southern Maine to the valley of the Saint Lawrence River, west through Ontario, central Michigan and Minnesota to eastern Nebraska, eastern Kansas, and the Indian Territory, south to western Florida and the valley of the Trinity River, Texas.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams and swamps, in low ground, or often on dry, rich uplands.

Wood heavy, very hard, strong, tough, close-grained, checking in drying; layers of annual growth marked by several rows of large open ducts; medullary rays numerous, obscure; color dark brown, the thick sap-wood light brown, or often nearly white; largely used for hoops, ox-yokes, etc.

247. Carya myristicæformis, Nutt.

Nutmeg Hickory.

South Carolina, near the coast; Arkansas, from the Arkansas River to the Red River Valley.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; sandy ridges, borders of streams and swamps; rare and very local in South Carolina; more common and reaching its greatest development in southern Arkansas.

Wood heavy, hard, very strong and tough, close-grained, compact, containing numerous small open ducts; layers of annual growth marked by one or two rows of larger ducts; medullary rays numerous, thin, not conspicuous; color light brown, the sap-wood lighter.

248. Carya aquatica, Nutt.

Water Hickory. Swamp Hickory. Bitter Pecan.

North Carolina, south near the coast to Cape Malabar and the Caloosa River, Florida (in Florida not detected within 8 to 10 miles of the coast),

through the Gulf States to western Louisiana, northeastern Arkansas, and the valley of the Brazos River, Texas.

A tree 18 to 21 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or generally much smaller; low river swamps; most common and reaching its greatest development on the bottom-lands of the lower Mississippi and Yazoo Rivers.

Wood heavy, soft, strong, rather brittle, very close-grained, compact, containing few scattered open ducts; layers of annual growth less clearly marked than in the other species of the genus; medullary rays numerous, thin; color dark brown, the sap-wood light, often nearly white; used for fencing, fuel, etc.

MYRICACEÆ.

249. Myrica cerifera, L.

Bayberry. Wax Myrtle.

Shores of Lake Erie; coast of Maine, and south near the coast to the Florida keys and southern Alabama.

A tree sometimes 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or, except in the Southern States, a low much-branched shrub; usually on sandy beaches and dry hillsides, reaching its greatest development on the bottoms and rich hummocks of the Georgia and Florida coasts.

Wood light, soft, strong, brittle, very close-grained, compact; medullary rays numerous, thin; color dark brown, the sap-wood lighter.

The leaves and stimulant and astringent bark of the roots are sometimes employed by herbalists. The wax which covers the small globular fruit was formerly largely collected and made into candles, and now, under the name of myrtle wax, is a popular remedy in the treatment of dysentery.

250. Myrica Californica, Cham.

Cape Foulweather, Oregon, south near the coast to the Bay of Monterey, California.

A small evergreen tree, rarely exceeding 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or toward its northern limits reduced to a low shrub; sandy beaches and gravelly hillsides.

Wood heavy, very hard, strong, brittle, very close-grained, compact; medullary rays numerous, thin, conspicuous; color light rose, the sap-wood lighter.

CUPULIFERÆ.

251. Quercus alba, L.

White Oak.

Northern Maine, valley of the Saint Lawrence River, Ontario, lower peninsula of Michigan to southeastern Minnesota, south to the Saint

John's River and Tampa Bay, Florida, west to western Missouri, western Arkansas, and the valley of the Brazos River, Texas.

A large tree, 24 to 45 metres in height, with a trunk 1.20 to 2.40 metres in diameter; all soils; very common, and reaching its greatest development along the western slopes of the Alleghany Mountains and in the valley of the Ohio River and its tributaries, where it often forms a large portion of the forest growth.

Wood strong, very heavy, hard, tough, close-grained, liable to check unless carefully seasoned, durable in contact with the soil; layers of annual growth strongly marked by several rows of large open ducts; medullary rays broad, prominent; color brown, the sap-wood lighter brown; largely used in ship-building, construction of all sorts, cooperage, in the manufacture of carriages, agricultural implements, and baskets, and for railway-ties, fencing, interior finish, cabinet-making, fuel, etc.

252. Quercus lobata, Née.

White Oak. Weeping Oak.

California west of the Sierra Nevadas, from the valley of the upper Sacramento River, south through the foot-hills and interior valleys to the San Bernardino Mountains.

The largest of the Pacific oaks, often 30 metres in height, with a trunk 0.90 to 2.40 metres in diameter; very common through the central part of the State.

Wood moderately hard, fine-grained, compact; layers of annual growth marked by a few large open ducts and containing few smaller ducts arranged in lines parallel to the broad conspicuous medullary rays; color light brown, the sap-wood lighter; considered of little economic value, and only used for fuel.

253. Quercus Garryana, Doug.

White Oak.

Vancouver's Island, shores of Puget Sound, south through western Washington, Oregon, and California to San Francisco Bay; in Washington and Oregon extending to the eastern slopes of the Cascade Mountains.

A tree 21 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or at high elevations reduced to a low shrub; dry, gravelly soil; common.

Wood strong, hard, that of the young trees tough, close-grained, compact; layers of annual growth marked by one to three rows of open ducts; medullary rays, varying greatly in width, often conspicuous; color light brown or yellow, the sap-wood lighter, often nearly white; somewhat used for carriage and cooperage stock, in cabinet-making, ship-building, and very largely for fuel; the best substitute for Eastern white oak produced in the Pacific forests.

254. Quercus obtusiloba, Michx.

Post Oak. Iron Oak.

Martha's Vineyard, Massachusetts, south to northern Florida, west through southern Ontario and Michigan to eastern Nebraska, eastern Kansas, and the Indian Territory, reaching the one hundredth meridian in central Texas.

A tree rarely exceeding 24 metres in height, with a trunk 0.90 to 1.50 metres in diameter, or on the Florida coast reduced to a low shrub (var. *parvifolia*, Chapm.); dry, gravelly uplands, clay barrens, or in the Southwest on Cretaceous formations; the most common and widely distributed oak of the Gulf States west of the Mississippi River.

Wood heavy, hard, close-grained, compact, checking badly in drying, very durable in contact with the soil; layers of annual growth marked by one to three rows of not large open ducts; medullary rays numerous, conspicuous; color dark or light brown, the sap-wood lighter; largely used, especially in the Southwest, for fencing, railway-ties, and fuel, and somewhat for carriage stock, cooperage, construction, etc.

255. Quercus undulata, var. Gambelii, Engelm.

Scrub Oak.

Mountain region of western Texas and New Mexico to the Santa Catalina and San Francisco Mountains, Arizona, eastern slopes of the Rocky Mountains of Colorado north to the valley of the Platte River, and on the Wahsatch Mountains of Utah.

A small tree, rarely 15 metres in height, with a trunk sometimes 0.60 metre in diameter, or often a low shrub spreading from underground shoots and forming dense thickets, reaching its greatest development on the high mountains of southern New Mexico and Arizona; the large specimens generally hollow and defective.

Wood heavy, hard, strong, that of young trees quite tough, close-grained, checking badly in drying; layers of annual growth marked by few not large open ducts; medullary rays numerous, conspicuous; color rich dark brown, the sap-wood lighter; largely used for fuel; and in Utah the bark in tanning.

The typical *Q. undulata*, Torr., of the central Rocky Mountain region does not attain arborescent size and habit.

256. Quercus macrocarpa, Michx.

Bur Oak. Mossy-cup Oak. Over-cup Oak.

Nova Scotia, New Brunswick, northern shores of Lake Huron to Lake Winnipeg, south to the valley of the Penobscot River, Maine, and along the shores of Lake Champlain and the valley of the Ware River, Massachusetts, to Lancaster County, Pennsylvania, west to the eastern foot-hills of the Rocky Mountains of Montana, central Nebraska and Kansas, southwest to the Indian Territory and the valley of the Nueces River, Texas.

A large tree of the first economic value, 24 to 50 metres in height, with a trunk 1.20 to 2.10 metres in diameter; rich bottoms and prairies; in the prairie region the principal growth of the "oak openings," and extending farther west and northwest than any oak of the Atlantic forests.

Wood heavy, strong, hard, tough, close-grained, compact, more durable in contact with the soil than that of other American oaks; layers of annual growth marked by one to three rows of small open ducts; medullary rays often broad and conspicuous; color dark or rich light brown, the sap-wood much lighter; generally confounded with white oak (*Q. alba*), and employed for the same purposes.

257. Quercus lyrata, Walt.

Over-cup Oak. Swamp Post Oak. Water White Oak.

North Carolina, south near the coast to western Florida, west through Alabama, Mississippi, and Louisiana to the valley of the Trinity River, Texas, and through Arkansas and southeastern Missouri to middle Tennessee, southern Indiana and Illinois.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; deep, often submerged river-swamps; rare in the Atlantic States; more common and reaching its greatest development in the valley of the Red River, in Arkansas and Texas.

Wood heavy, hard, strong, tough, very durable in contact with the ground, close-grained, inclined to check in drying; layers of annual growth marked by one to three rows of large open ducts; medullary rays broad, numerous, conspicuous; color rich dark brown, the sap-wood much lighter; used for the same purposes as that of the white oak (*Q. alba*).

258. Quercus bicolor, Willd.

Swamp White Oak.

Southern Maine, valley of the upper Saint Lawrence River, Ontario, southern peninsula of Michigan to southeastern Iowa and western Missouri, south to Delaware, and along the Alleghany Mountains to northern Georgia, northern Kentucky, and northern Arkansas.

A large tree, 24 to 36 metres in height, with a trunk 1.20 to 3 metres in diameter; borders of streams and swamps, in deep alluvial soil; common and reaching its greatest development in the region south of the great lakes.

Wood heavy, hard, strong, tough, close-grained, inclined to check in seasoning; layers of annual growth marked by one to three rows of large open ducts; medullary rays broad, conspicuous; color light brown, the sap-wood hardly distinguishable; used for the same purposes as that of the white oak (*Q. alba*).

259. Quercus Michauxii, Nutt.

Basket Oak. Cow Oak.

Delaware, south through the lower and middle districts to northern Florida, through the Gulf States to the valley of the Trinity River, Texas, and through Arkansas and southeastern Missouri to central Tennessee and Kentucky, and southern Illinois and Indiana.

A tree 24 to 36 metres in height, with a trunk 1.20 to 2.10 metres in diameter; borders of streams and deep, often submerged swamps; the common and most valuable white oak of the Gulf States, reaching its greatest development on the rich bottom-lands of southeastern Arkansas and Louisiana.

Wood heavy, hard, very strong, tough, close-grained, compact, very durable in contact with the soil, easily split; layers of annual growth marked by few rather large open ducts; medullary rays broad, conspicuous; color light brown, the sap-wood darker; largely used in the manufacture of agricultural implements, wheel-stock, baskets, for which it is unsurpassed, for cooperage, fencing, construction, and fuel.

The large sweet edible acorns are eagerly devoured by cattle and other animals.

260. Quercus Prinus, L.

Chestnut Oak. Rock Chestnut Oak.

Eastern Massachusetts, west to the shores of Lake Champlain, shores of Quinté Bay, Ontario, and the valley of the Genesee River, New York, south to Delaware, and through the Alleghany Mountain region to northern Alabama, extending west to central Kentucky and Tennessee.

A tree 24 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rocky banks and hillsides; very common and reaching its greatest development in the southern Alleghany region, here often forming a large proportion of the forest growth.

Wood heavy, hard, strong, rather tough, close-grained, inclined to check in drying, durable in contact with the soil, containing few open ducts; medullary rays very broad, conspicuous; color dark brown, the sap-wood lighter; largely used in fencing, for railway-ties, etc.

The bark, rich in tannin, is largely used in preference to that of the other white oaks in tanning leather.

261. Quercus prinoides, Willd.

Yellow Oak. Chestnut Oak. Chinquapin Oak.

Eastern Massachusetts, shores of Lake Champlain, west along the northern shores of Lakes Ontario and Erie, through southern Michigan to eastern Nebraska, eastern Kansas, and the Indian Territory; south to Delaware and through the Alleghany region to northern Alabama and Mississippi, extending southwest to the Guadalupe Mountains, Texas.

A tree 24 to 39 metres in height, with a trunk 0.60 to 0.90 metre in diameter (*Q. Muhlenbergii*), or often, especially toward the eastern and western limits of its range, reduced to a low, slender shrub (*Q. prinoides; Q. Prinus*, var. *humilis*, Marsh.; *Q. Prinus*, var. *Chincapin*, Michx. f.); dry hillsides and low, rich bottoms; rare, except as a shrub, east of the Alleghany Mountains; very common in the Mississippi River basin, and reaching its greatest development in southern Arkansas.

Wood heavy, hard, very strong, close-grained, checking badly in drying, very durable in contact with the soil; layers of annual growth marked by rows of small open ducts; medullary rays broad, conspicuous; color dark brown, the sap-wood much lighter; used for cooperage, wheel-stock, fencing, railway-ties, etc.

The small acorns sweet and edible.

262. Quercus Douglasii, Hook. & Arn.

Mountain White Oak. Blue Oak.

California, — from about latitude 39°, south along the western foothills of the Sierra Nevadas below 4,000 feet elevation, and through the Coast Ranges to the San Gabriel Mountains.

A tree 18 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; common on the low foot-hills of the Sierras.

Wood very hard, heavy, strong, brittle, inclined to check in drying; layers of annual growth marked by several rows of small open ducts, and containing many scattered groups of smaller ducts; medullary rays numerous, varying greatly in width; color dark brown, becoming nearly black with exposure, the thick sap-wood light brown.

263. Quercus oblongifolia, Torr.

White Oak.

California, — foot-hills of the San Gabriel Mountains to San Diego County; foot-hills of the mountain ranges of southern Arizona and New Mexico; in northern Mexico.

A small evergreen tree, 12 to 15 metres in height, with a trunk 0.45 to 0.60 metre in diameter; the large specimens generally hollow and defective.

Wood very heavy, hard, strong, brittle, very close-grained, checking badly in drying; layers of annual growth hardly distinguishable, containing few small open ducts arranged in many groups parallel to the broad and very conspicuous medullary rays; color very dark brown or almost black, the thick sap-wood brown; of little economic value except as fuel.

264. Quercus grisea, Liebm.

White Oak.

Southern Colorado, mountains of western Texas, southern New Mexico and Arizona between 5,000 and 10,000 feet elevation, west to the Colorado desert of California; in northern Mexico.

A tree 15 to 24 metres in height, with a trunk rarely exceeding 0.60 metre in diameter, or reduced to a low, much-branched shrub; a polymorphous species, varying greatly in habit and in the shape and texture of the leaves, but apparently well characterized by its connate cotyledons; the large specimens generally hollow and defective.

Wood very heavy, strong, hard, close-grained, checking badly in drying; layers of annual growth marked by one or two rows of small open ducts, these connected by rows of similar ducts parallel to the numerous conspicuous medullary rays; color very dark brown, the thick sap-wood much lighter.

265. Quercus reticulata, Humb. & Bonp.

Southeastern Arizona, — San Francisco, and Santa Rita Mountains between 7,000 and 10,000 feet elevation; in northern Mexico.

A small tree, 9 to 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter; dry, gravelly slopes.

Wood very heavy, hard, close-grained, checking badly in drying, containing many small scattered open ducts; medullary rays numerous, very broad; color dark brown, the sap-wood lighter.

266. Quercus Durandii, Buckley.

Central Alabama; western and southern Texas.

A tree 21 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; rich bottom-lands, or dry slopes and limestone hills, then reduced to a low shrub forming dense, impenetrable thickets of great extent (*Q. San-Sabeana*); very rare and local in Alabama; the common and most valuable white oak of western Texas.

Wood very heavy and hard, strong, brittle, close-grained, inclined to check in drying; layers of annual growth marked by few large open ducts; medullary rays numerous, conspicuous; color brown, the sap-wood lighter; used for the same purposes as that of the white oak (*Q. alba*).

267. Quercus virens, Ait.

Live Oak.

Southern Virginia, south along the coast to Bay Biscayne and Cape Romano, Florida, along the Gulf Coast to Mexico, extending through western Texas to the valley of the Red River, the Apache and Guadalupe Mountains, and the mountains of northern Mexico south of the Rio Grande, here between 6,000 and 8,000 feet elevation; in Costa Rica.

An evergreen tree, 15 to 18 metres in height, with a trunk 1.50 to 2.10 metres in diameter, or in the interior of Texas much smaller and often shrubby; on the coast, on rich hummocks and ridges, a few feet above water-level; common and reaching its greatest development in the south Atlantic States.

Wood very heavy, hard, strong, tough, very close-grained, compact, difficult to work, susceptible of a beautiful polish; layers of annual growth obscure, often hardly distinguishable, containing many small open ducts arranged in short broken rows parallel to the broad conspicuous medullary rays; color light brown or yellow, the sap-wood nearly white; formerly very largely and now occasionally used in ship-building.

268. Quercus chrysolepis, Liebm.

Live Oak. Maul Oak. Valparaiso Oak.

Southwestern Oregon, south through the California Coast Ranges and along the western slopes of the Sierra Nevada and San Bernardino Mountains between 3,000 and 8,000 feet elevation, and south into Lower California; southeastern Arizona, San Francisco and Santa Catalina Mountains.

An evergreen tree, 18 to 27 metres in height, with a trunk sometimes 1.50 metres in diameter, or at high elevations reduced to a low narrow-leaved shrub (var. *vaccinifolia*, Engelm.).

Wood heavy, very strong and hard, tough, close-grained, compact, difficult to work, containing many rather small open ducts arranged in wide bands parallel to the broad conspicuous medullary rays; color light brown, the sap-wood darker; somewhat used in the manufacture of agricultural implements, wagons, etc.; the most valuable oak of the Pacific forests.

269. Quercus Emoryi, Torr.

Black Oak.

Western Texas, and through the mountain ranges of southern New Mexico and eastern and southern Arizona.

A tree 12 to 15 metres in height, with a trunk 0.30 to 0.90 metre in diameter, or toward its eastern limits in Texas reduced to a low shrub; common and reaching its greatest development in southwestern New Mexico and southern Arizona near streams in open cañons between 5,000 and 7,000 feet elevation; dry, gravelly soil, the large specimens hollow and defective.

Wood very heavy, not hard, strong, brittle, close-grained, compact; layers of annual growth marked by several rows of small open ducts, these connected by narrow groups of similar ducts parallel to the broad conspicuous medullary rays; color dark brown or almost black, the thick sap-wood bright brown tinged with red.

270. Quercus agrifolia, Née.

Coast Live Oak. Enceno.

California, — Mendocino County, south through the valleys of the Coast Ranges to Lower California.

A large evergreen tree, 24 to 30 metres in height, with a trunk 1.20 to 2.10 metres in diameter, or, rarely, reduced to a low shrub (var *frutescens*, Engelm.); rare at the North; common south of San Francisco Bay, and the largest and most generally distributed oak in the extreme southwestern part of the State; dry slopes and ridges.

Wood heavy, hard, strong, brittle, close-grained, compact; layers of annual growth hardly distinguishable, containing many large open ducts arranged in several rows parallel to the broad conspicuous medullary rays; color light brown or red, the sap-wood darker brown; of little value except as fuel.

271. Quercus Wislizeni, A. DC.

Live Oak.

California, — Mount Shasta region, south along the western slopes of the Sierra Nevadas to Tulare County, and in the Coast Ranges south to the Santa Lucia Mountains.

An evergreen tree, 15 to 18 metres in height, with a trunk 0.90 to 1.80 metres in diameter, or toward its northeastern limits reduced to a low shrub (var. *frutescens*, Engelm.); not common.

Wood heavy, very hard, strong, close-grained, compact, containing numerous large open ducts arranged in irregular bands parallel to the broad conspicuous medullary rays; color light brown tinged with red, the sap-wood lighter.

272. Quercus rubra, L.

Red Oak. Black Oak.

Nova Scotia, southern New Brunswick to eastern Minnesota, western Iowa, eastern Kansas, and the Indian Territory; south to northern Florida, southern Alabama and Mississippi, and the Limpia Mountains, western Texas.

A large tree, 30 to 45 metres in height, with a trunk 1.20 to 2.10 metres in diameter; very common in all soils and extending farther north than any other Atlantic oak. The form of western Texas, with smaller acorns and deeper cups, and more deeply divided leaves, the wood heavier, harder, and more compact, is var. *Texana*, Buckley.

Wood heavy, hard, strong, coarse-grained, inclined to check in drying; layers of annual growth marked by several rows of very large open ducts; medullary rays few, conspicuous; color light brown or red, the sap-wood somewhat darker; now largely used for clapboards, cooperage, and somewhat for interior finish, in the manufacture of chairs, etc.

273. Quercus coccinea, Wang.

Scarlet Oak.

Southern Maine to northern New York, Ontario, northern Michigan and Minnesota, eastern Iowa and northeastern Missouri, south to Delaware

and southern Tennessee, and through the Alleghany region to northern Florida.

A tree 30 to 54 metres in height, with a trunk rarely exceeding 0.60 to 1.20 metres in diameter; at the East, in dry, sandy soil or, less commonly, in rich, deep loam; in the Northwest, with *Q. macrocarpa*, forming the oak-opening growth; not common, and reaching its greatest development in the basin of the lower Ohio River.

Wood heavy, hard, strong, coarse-grained; layers of annual growth strongly marked by several rows of large open ducts; medullary rays thin, conspicuous; color light brown or red, the sap-wood rather darker; if used at all, confounded with that of *Q. rubra.*

274. Quercus tinctoria, Bartram.

Black Oak. Yellow-bark Oak. Quercitron Oak. Yellow Oak.

Southern Maine to northern Vermont, Ontario and southern Minnesota, eastern Nebraska, eastern Kansas, and the Indian Territory, south to western Florida, southern Alabama and Mississippi, and eastern Texas.

A large tree, 36 to 48 metres in height, with a trunk 0.90 to 1.80 metres in diameter; generally on dry or gravelly uplands; very common.

Wood heavy, hard, strong, not tough, coarse-grained, liable to check in drying; layers of annual growth marked by several rows of very large open ducts; color bright brown tinged with red, the sap-wood much lighter; somewhat used in cooperage and for construction, etc.

The bark largely used in tanning; the intensely bitter inner bark yields a valuable yellow dye, and is occasionally used medicinally in the form of decoctions, etc., in the treatment of hemorrhage.

275. Quercus Kelloggii, Newberry.

Black Oak.

Valley of the Mackenzie River, Oregon, south through the Coast Ranges and along the western slopes of the Sierra Nevada and San Bernardino Mountains to the southern borders of California.

A large tree, 18 to 24 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or at high elevations reduced to a shrub; the most common and important oak of the valleys of southwestern Oregon and the California Sierras.

Wood heavy, hard, strong, very brittle, close-grained, compact; layers of annual growth marked by several rows of large open ducts; medullary rays few, broad, conspicuous; color light red, the thin sap-wood lighter; of little value, except as fuel; the bark somewhat used in tanning.

276. Quercus nigra, L.

Black Jack. Jack Oak.

Long Island, New York, west through northern Ohio and Indiana to southern Wisconsin, southern Minnesota, eastern Nebraska, eastern

Kansas, and the Indian Territory, south to Matanzas Inlet and Tampa Bay, Florida, and the valley of the Nueces River, Texas.

A small tree, sometimes 12 or even 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter, or more often much smaller; dry, barren uplands, or often on heavy clay soils; very common through the Southern States, and reaching its greatest development in southwestern Arkansas, the Indian Territory, and eastern Texas, forming, with the post oak (*Q. obtusiloba*), the growth of the Texas cross-timbers.

Wood heavy, hard, strong, checking badly in drying; layers of annual growth marked by several rows of large open ducts; medullary rays broad, conspicuous; color rather dark rich brown, the sap-wood much lighter; of little value except as fuel.

277. Quercus falcata, Michx.

Spanish Oak. Red Oak.

Long Island, New York, south to middle Florida, through the Gulf States to the valley of the Brazos River, Texas, and through Arkansas and southeastern Missouri to central Tennessee and Kentucky, southern Illinois and Indiana.

A large tree, 24 to 30 metres in height, with a trunk 0.90 to 1.80 metres in diameter; dry, gravelly uplands and barrens; in the North Atlantic States only near the coast, rare; most common and reaching its greatest development in the South Atlantic and Gulf States, where, in the middle districts, it is the most common forest tree.

Wood heavy, very hard and strong, not durable, coarse-grained, checking badly in drying; layers of annual growth strongly marked by several rows of large open ducts; medullary rays few, conspicuous; color light red, the sap-wood lighter; somewhat used for cooperage, construction, etc., and very largely for fuel.

The bark is rich in tannin.

278. Quercus Catesbæi, Michx.

Turkey Oak. Scrub Oak. Forked-leaf Black Jack. Black Jack.

North Carolina, south near the coast to Cape Malabar and Pease Creek, Florida, and along the coast of Alabama and Mississippi.

A small tree, 7 to 15 metres in height, with a trunk 0.45 to 0.60 metre in diameter; very common in the South Atlantic and east Gulf States upon barren sandy hills and ridges of the maritime pine-belt; rare in Mississippi.

Wood heavy, hard, strong, close-grained, compact; layers of annual growth marked by several rows of large open ducts, and containing many much smaller ducts arranged in short lines parallel to the broad conspicuous medullary rays; color light brown tinged with red, the sap-wood somewhat lighter; largely used for fuel.

279. Quercus palustris, Du Roi.

Pin Oak. Swamp Spanish Oak. Water Oak.

Valley of the Connecticut River, Massachusetts, to central New York, south to Delaware and the District of Columbia; southern Wisconsin to eastern Kansas, southern Arkansas, and southeastern Tennessee.

A tree 24 to 30 or, exceptionally, 36 metres in height, with a trunk 0.90 to 1.50 metres in diameter; low, rich soil, generally along the borders of streams and swamps; most common and reaching its greatest development west of the Alleghany Mountains.

Wood heavy, hard, very strong, coarse-grained, inclined to check badly in drying; layers of annual growth marked by several rows of large open ducts; medullary rays broad, numerous, conspicuous; color light brown, the sap-wood rather darker; somewhat used for shingles, clapboards, construction, and in cooperage.

280. Quercus aquatica, Walt.

Water Oak. Duck Oak. Possum Oak. Punk Oak.

Southern Delaware, south through the coast and middle districts to Cape Malabar and Tampa Bay, Florida; through the Gulf States to the valley of the Colorado River, Texas, and through Arkansas to southeastern Missouri, middle Kentucky and Tennessee.

A tree 15 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; generally along streams and bottoms, in heavy, undrained soil, or, more rarely, upon uplands; very common and reaching its greatest development near the larger streams of the maritime pine-belt in the eastern Gulf States.

Wood heavy, hard, strong, coarse-grained, compact; layers of annual growth marked by several rows of large open ducts; medullary rays thin, conspicuous; color rather light brown, the sap-wood lighter; probably not used except as fuel.

281. Quercus laurifolia, Michx.

Laurel Oak.

North Carolina, south near the coast to Mosquito Inlet and Cape Romano, Florida, and along the Gulf coast to the shores of Mobile Bay.

A large tree, 18 to 24 metres in height, with a trunk 0.90 to 1.20 metres in diameter; most common and reaching its greatest development on the rich hummocks of the Florida coast.

Wood heavy, very strong and hard, coarse-grained, inclined to check in drying; layers of annual growth marked by several rows of rather small open ducts; medullary rays broad, conspicuous; color dark brown tinged with red, the sap-wood lighter.

282. Quercus heterophylla, Michx. f.

Bartram's Oak.

Salem and Cumberland Counties, New Jersey; North Carolina (*M. A. Curtis*); and doubtfully from North Carolina and eastern Texas.

A small tree, 12 to 15 metres in height, with a trunk 0.45 to 0.60 metre in diameter; rare and very local, and often considered a natural hybrid.

Wood heavy, hard, very strong, close-grained, compact; layers of annual growth marked by several rows of small open ducts; medullary rays numerous, conspicuous; color light brown tinged with red, the sap-wood somewhat darker.

283. Quercus cinerea, Michx.

Upland Willow Oak. Blue Jack. Sand Jack.

North Carolina, south near the coast to Cape Malabar and Pease Creek, Florida, west along the Gulf coast to the valley of the Brazos River, Texas, extending north through eastern Texas to about latitude 33°.

A tree 9 to 15 metres in height, with a trunk rarely exceeding 0.20 metre in diameter; sandy barrens and dry upland ridges.

Wood heavy, hard, strong, close-grained, compact; layers of annual growth marked by several rows of not large open ducts; medullary rays distant, thin, conspicuous; color light brown tinged with red, the sap-wood darker.

284. Quercus hypoleuca, Engelm.

Limpia Mountains, Texas, valleys of the high mountain ranges of southwestern New Mexico, Santa Rita Mountains, Arizona, above 6,000 feet elevation; in Sonora.

A small evergreen tree, 9 to 15 metres in height, with a trunk sometimes 0.75 metre in diameter; dry, gravelly slopes and summits, the large specimens hollow and defective.

Wood heavy, very strong and hard, close-grained, compact; layers of annual growth marked by few small open ducts; medullary rays broad, conspicuous; color dark brown, the sap-wood much lighter.

285. Quercus imbricaria, Michx.

Shingle Oak. Laurel Oak.

Eastern Pennsylvania, west through southern Michigan, southern Wisconsin, and southeastern Iowa to southeastern Nebraska and northeastern Kansas, south to northern Georgia and Alabama, middle Tennessee, and northern Arkansas.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich woodlands.

Wood heavy, hard, rather coarse-grained, checking badly in drying; layers of annual growth marked by many rows of large open ducts;

medullary rays broad, conspicuous; color light brown tinged with red, the sap-wood much lighter; occasionally used for clapboards, shingles, etc.

286. Quercus Phellos, L.

Willow Oak. Peach Oak.

Staten Island, New York, south near the coast to northeastern Florida, through the Gulf States to the valley of the Sabine River, Texas, and through Arkansas to southeastern Missouri, Tennessee, and southern Kentucky.

A tree 18 to 24 metres in height, with a trunk sometimes 0.90 metre in diameter; bottom-lands or rich sandy uplands.

Wood heavy, strong, not hard, rather close-grained, compact; layers of annual growth marked by several rows of small open ducts; medullary rays few, distant; color light brown tinged with red, the sap-wood lighter red; somewhat used for fellies of wheels, clapboards, in construction, etc.

287. Quercus densiflora, Hook. & Arn.

Tan-bark Oak. Chestnut Oak. Peach Oak.

Southwestern Oregon, south through the Coast Ranges to the Santa Lucia Mountains, California.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich valleys and banks of streams; most common and reaching its greatest development in the redwood forests of the California coast.

Wood heavy, hard, strong, very close-grained, compact, containing broad bands of small open ducts parallel to the thin dark conspicuous medullary rays; color bright reddish-brown, the thick sap-wood darker brown; largely used as fuel.

The bark, rich in tannin, is very largely used, and preferred to that of any other tree of the Pacific forests, for tanning.

288. Castanopsis chrysophylla, A. DC.

Chinquapin.

Cascade Mountains, Oregon, below 4,000 feet elevation, south along the western slopes of the Sierras, and through the California Coast Ranges to the San Bernardino and San Jacinto Mountains.

A tree 15 to 24 metres in height, with a trunk 0.30 to 0.90 metre in diameter, or at high elevations and toward its southern limits reduced to a low shrub; most common and reaching its greatest development in the Coast Range valleys of northern California; at its southern limits rarely below 10,000 feet elevation.

Wood light, soft, not strong, close-grained, compact; layers of annual growth marked by a single row of rather large open ducts; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter; in southern Oregon occasionally used in the manufacture of ploughs and other agricultural implements.

289. Castanea pumila, Mill.

Chinquapin.

Southern Pennsylvania, and the valley of the lower Wabash River, Indiana, south and southwest to northern Florida and the valley of the Neches River, Texas.

A tree sometimes 15 metres in height, with a trunk 0.30 to 1.05 metres in diameter, or often, especially in the Atlantic States, reduced to a low shrub; rich hillsides and borders of swamps; most common and reaching its greatest development in southern Arkansas.

Wood light, hard, strong, coarse-grained, durable in contact with the ground, liable to check in drying; layers of annual growth marked by many rows of large open ducts; medullary rays numerous, obscure; color dark brown, the sap-wood hardly distinguishable; used for posts, rails, railway-ties, etc.

The small nuts sweet and edible.

290. Castanea vulgaris, var. Americana, A. DC.

Chestnut.

Southern Maine to northern Vermont, southern Ontario and southern Michigan, south through the northern States to Delaware and southern Indiana, and along the Alleghany Mountains to northern Alabama, extending west to middle Kentucky and Tennessee.

A large tree, 24 to 30 metres in height, with a trunk 1.80 to 4 metres in diameter; rich woods and hillsides; common and reaching its greatest development on the western slopes of the southern Alleghany Mountains.

Wood light, soft, not strong, coarse-grained, liable to check and warp in drying, easily split, very durable in contact with the soil; layers of annual growth marked by many rows of large open ducts; medullary rays numerous, obscure; color brown, the sap-wood lighter; largely used in cabinet-making, for railway-ties, posts, fencing, etc.

The fruit sweet and edible.

291. Fagus ferruginea, Ait.

Beech.

Nova Scotia and the valley of the Restigouche River to the northern shores of Lake Huron and northern Wisconsin, south to western Florida, west to eastern Illinois, southeastern Missouri, northeastern Arkansas, and the Trinity River, Texas.

A large tree, 24 to 34 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rich woods, or at the South sometimes on bottom-lands or borders of swamps; reaching its greatest development upon the "bluff" formations of the lower Mississippi basin; very common.

Wood very hard, strong, tough, very close-grained, not durable in contact with the soil, inclined to check in drying, difficult to season,

susceptible of a beautiful polish; medullary rays broad, very conspicuous; color, varying greatly with soil and situation, dark or often very light red, the sap-wood nearly white; largely used in the manufacture of chairs, shoe-lasts, plane-stocks, handles, etc., and for fuel.

292. Ostrya Virginica, Willd.

Hop Hornbeam. Iron-wood. Lever-wood.

Bay of Chaleur, through the valleys of the Saint Lawrence and lower Ottawa Rivers, northern shore of Lake Huron to northern Minnesota, south through the Northern States and along the Alleghany Mountains to western Florida, and through eastern Iowa, southeastern Missouri, and Arkansas, to eastern Kansas, the Indian Territory, and eastern Texas.

A small tree, 9 to 15 metres in height, with a trunk 0.30 to 0.60 metre in diameter; generally on dry, gravelly hillsides and knolls; reaching its greatest development in southern Arkansas; common.

Wood heavy, very strong and hard, tough, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; medullary rays numerous, obscure; color light brown tinged with red, or, like the sap-wood, often nearly white; used for posts, levers, handles of tools, etc.

293. Carpinus Caroliniana, Walt.

Hornbeam. Blue Beech. Water Beech. Iron-wood.

Nova Scotia, southern New Brunswick, northern shores of Georgian Bay, southern peninsula of Michigan to northern Minnesota, south to Cape Malabar and Tampa Bay, Florida, and the valley of the Trinity River, Texas, west to central Iowa, eastern Kansas, and the valley of the Poteau River, Indian Territory.

A small tree, 9 to 15 metres in height, with a trunk sometimes 0.60 to 0.90 metre in diameter, or at the North much smaller and often reduced to a low shrub; borders of streams and swamps, in moist soil; most common and reaching its greatest development along the western slopes of the southern Alleghany Mountains and in southern Arkansas and eastern Texas.

Wood heavy, very strong and hard, close-grained, inclined to check in drying; medullary rays numerous, broad; color light brown, the thick sap-wood nearly white; sometimes used for levers, handles of tools, etc.

BETULACEÆ.

294. Betula alba, var. populifolia, Spach.

White Birch. Old-field Birch. Gray Birch.

New Brunswick and the valley of the lower Saint Lawrence River to the southern shores of Lake Ontario, south, generally near the coast, to northern Delaware.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; dry, gravelly, barren soil, or borders of swamps.

Wood light, soft, not strong, close-grained, liable to check in drying, not durable; medullary rays numerous, obscure; color light brown, the sap-wood nearly white; largely used in the manufacture of spools, shoe-pegs, wood-pulp, etc., for hoop-poles and fuel.

The bark and leaves, as well as those of *B. papyrifera* and *B. lenta*, are popularly esteemed as a remedy for various chronic diseases of the skin, bladder, etc., and in rheumatic and gouty complaints; the empyreumatic oil of birch obtained from the inner bark by distillation is used externally and internally for the same purposes.

295. Betula papyrifera, Marsh.

Canoe Birch. White Birch. Paper Birch.

Northern Newfoundland and Labrador to the southern shores of Hudson Bay, and northwest to the Great Bear Lake and the valley of the Yukon River, Alaska, south, in the Atlantic region to Long Island, New York, the mountains of northern Pennsylvania, central Michigan, northeastern Illinois and central Minnesota; in the Pacific region south to the Black Hills of Dakota, the Bitter-root Mountains and Flathead Lake, Montana, northern Washington, and the valley of the lower Fraser River, British Columbia.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich woodlands and banks of streams; very common in the northern Atlantic region, and reaching a higher latitude than any deciduous tree of the American forest.

Wood light, strong, hard, tough, very close-grained, compact; medullary rays numerous, obscure; color brown tinged with red, the sap-wood nearly white; largely used in the manufacture of spools, shoe lasts and pegs, in turnery, for fuel, wood-pulp, etc.

The very tough, durable bark, easily separated into thin layers, is impervious to water, and is largely used in the manufacture of canoes, tents, etc.

296. Betula occidentalis, Hook.

Black Birch.

British Columbia, south to northern California, and through the interior ranges and Rocky Mountains to Montana, Utah, and northern New Mexico.

A small tree, 8 to 12 metres in height, with a trunk sometimes 0.30 to 0.45 metre in diameter; mountain cañons and borders of streams, in moist soil, often throwing up several stems from the ground and forming dense thickets.

Wood soft, strong, brittle, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood lighter; somewhat used for fencing, fuel, etc.

297. Betula lutea, Michx. f.

Yellow Birch. Gray Birch.

Newfoundland, northern shores of the Gulf of Saint Lawrence to the western shores of Lake Superior and Rainy Lake, south through the northern States to Delaware and southern Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina and Tennessee.

The largest and one of the most valuable deciduous trees of the northern Atlantic forests, often 21 to 29 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rich woodlands; common.

Wood heavy, very strong and hard, very close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, obscure; color light brown tinged with red, the heavier sap-wood nearly white; largely used for fuel, in the manufacture of furniture, button and tassel moulds, pill and match boxes, and for the hubs of wheels.

298. Betula nigra, L.

Red Birch. River Birch.

Banks of the Merrimac and Spicket Rivers, Massachusetts, Long Island, New York, south through the coast and middle districts to western Florida, west to western Iowa, northwestern Missouri, eastern Kansas, the Indian Territory, and the valley of the Trinity River, Texas.

A tree 18 to 24 metres in height, with a trunk rarely exceeding 0.75 metre in diameter; banks of streams and ponds; very common and reaching its greatest development in the South Atlantic and Gulf States.

Wood light, rather hard, strong, close-grained, compact; medullary rays numerous, obscure; color brown, the sap-wood much lighter; used in the manufacture of furniture, wooden-ware, wooden shoes, ox-yokes, etc.

299. Betula lenta, L.

Cherry Birch. Black Birch. Sweet Birch. Mahogany Birch.

Newfoundland and the valley of the Saguenay River, west through Ontario to the islands of Lake Huron, south to northern Delaware and southern Indiana, and along the Alleghany Mountains to western Florida, extending west to middle Kentucky and Tennessee.

A tree 18 to 24 metres in height, with a trunk 0.90 to 1.50 metres in diameter; rich woods; very common in all northern forests.

Wood heavy, very strong and hard, close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, obscure; color dark brown tinged with red, the sap-wood light brown or yellow; now largely used in the manufacture of furniture and for fuel; in Nova Scotia and New Brunswick largely in ship-building.

300. Alnus maritima, Muhl.

Seaside Alder.

Southern Delaware and eastern Maryland, near the coast; valley of the Red River, Indian Territory, in about longitude 96° 30′ W.; Manchuria and Japan (*A. maritima*, *Japonica*, and *arguta*, Regel).

A small tree, 6 to 7 metres in height, with a trunk 0.10 to 0.15 metre in diameter; borders of streams and swamps.

Wood light, soft, close-grained, checking badly in drying; medullary rays broad, conspicuous; color light bright brown, the sap-wood hardly distinguishable, somewhat lighter.

301. Alnus rubra, Bong.

Alder.

Sitka, south through the islands and Coast Ranges of British Columbia, western Washington, Oregon, and California to Santa Barbara, extending east through the Blue Mountains of Washington and Oregon to northern Montana.

A large tree, 24 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or in British Columbia and the Blue Mountains often reduced to a low shrub; bottom-lands and borders of streams; most common and reaching its greatest development in western Washington and Oregon.

Wood light, soft, not strong, brittle, very close-grained, compact, easily worked, satiny, susceptible of a beautiful polish; medullary rays distant, broad; color light brown tinged with red, the sap-wood nearly white; largely used in Oregon in the manufacture of furniture.

302. Alnus rhombifolia, Nutt.

Alder.

Valley of the lower Fraser River, British Columbia, south through the Coast Ranges to southern California, extending east along the ranges of Washington to Clear Creek, Idaho, and the valley of the Flathead River, Montana.

A small tree, 9 to 15 metres in height, with a trunk sometimes 0.60 to 0.90 metre in diameter, or toward its northern and eastern limits reduced to a shrub; borders of streams; the common alder of the California valleys.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood lighter, often nearly white.

303. Alnus oblongifolia, Torr.

Alder.

San Bernardino and Cuyamaca Mountains, California, through the ranges of southern Arizona and New Mexico to the valley of the upper Rio Grande; in northern Mexico.

A tree 15 to 21 metres in height, with a trunk 0.90 to 1.20 metres in diameter; borders of streams in deep mountain cañons.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very obscure; color light brown tinged with yellow, the sap-wood nearly white.

304. Alnus serrulata, Willd.

Black Alder. Smooth Alder.

Massachusetts, west to southern Missouri, south to northern Florida and the valley of the Trinity River, Texas.

A small tree, 6 to 12 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or more often a tall, branching shrub forming dense thickets; borders of streams and swamps, probably reaching its greatest development in southern Arkansas.

Wood light, soft, close-grained, compact; medullary rays numerous, conspicuous; color light brown, the sap-wood lighter.

A decoction of the bark and leaves, as well as those of *A. incana*, is a popular remedy against impurity of the blood and in the treatment of diarrhœa, hæmaturia, etc.

305. Alnus incana, Willd.

Speckled Alder. Hoary Alder. Black Alder.

Newfoundland to the eastern base of the Rocky Mountains, south to northern New England, Wisconsin, Minnesota, and eastern Nebraska; in Europe.

A small tree, 6 to 7 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or more often a tall, branching shrub; borders of streams and swamps. A form with leaves green and glabrous on both sides or slightly pubescent, extending through the mountain ranges of the Pacific region from the Saskatchewan and British Columbia to New Mexico and the southern Sierra Nevadas of California, is var. *virescens*, Watson.

Wood light, soft, close-grained, checking in drying; medullary rays numerous, broad; color light brown, the sap-wood nearly white; preferred and largely used in northern New England in the final baking of bricks, and occasionally, as well as that of *A. serrulata*, in the manufacture of gunpowder.

SALICACEÆ.

306. Salix nigra, Marsh.

Black Willow.

Southern New Brunswick and the northern shores of Lakes Huron and Superior southward through the Atlantic region to Bay Biscayne and the Caloosa River, Florida, and the valley of the Guadalupe River, Texas;

Pacific region, — valleys of the Sacramento River, California, and the Colorado River, Arizona.

A small tree, sometimes 15 to 18 metres in height, with a trunk rarely 0.60 metre in diameter, or in southern Florida reduced to a low shrub; banks of streams; most common in the basin of the Mississippi River, and reaching its greatest development on the rich bottom-lands of the Colorado and other rivers of eastern Texas; varying greatly in the size and shape of the leaves (vars. *angustifolia*, *longifolia*, *latifolia*, etc., Anders.), length and habit of the aments, etc. (vars. *marginata* and *Wrightii*, Anders., var. *Wardii*, Bebb).

Wood light, soft, weak, close-grained, checking badly in drying; medullary rays obscure; color brown, the sap-wood nearly white.

The tonic and astringent bark is used domestically as a popular febrifuge, containing, in common with all the species of the genus, salicylic acid, — a powerful antipyretic now successfully used in the treatment of acute cases of gout, rheumatism, typhoid fever, etc.

307. Salix amygdaloides, Anders.

Willow.

Shores of the great lakes (New York and Ohio), west to the valley of the Saskatchewan, and southward through the Rocky Mountain region to southern New Mexico; banks of the lower Columbia River, Oregon.

A small tree, rarely 9 to 12 metres in height, with a trunk 0.15 to 0.30 metre in diameter; borders of streams.

Wood light, soft, not strong, close-grained, checking in drying; color light brown, the sap-wood nearly white.

308. Salix lævigata, Bebb.

Willow.

California, — Sierra County and the valley of the Sacramento River to the southern boundary of the State.

A tree sometimes 15 metres in height, with a trunk 0.30 to 0.60 metre in diameter; borders of streams and bottom-lands. Forms varying in the shape of the leaves, length of aments, etc., are vars. *angustifolia* and *congesta*, Bebb.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very thin; color light brown tinged with red.

309. Salix lasiandra, Benth.

Willow.

British Columbia, south to the valley of the Sacramento River, California; mountains of Utah, Colorado to New Mexico (var. *Fendleriana*).

A tree 12 to 18 metres in height, with a trunk sometimes 0.60 metre in diameter; banks of streams; very common; varying in the shape of the leaves and character of the aments (var. *lancifolia* and *Fendleriana*, Bebb).

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very obscure; color light brown, the sap-wood lighter or often nearly white.

310. Salix longifolia, Muhl.

Sand-bar Willow.

Valley of the Connecticut River and of the Potomac River at Washington; west and northwest through the region of the great lakes to the valley of the Mackenzie River, in latitude 66° N., through the Mississippi basin, Texas, the Rocky Mountain region, and the Pacific Coast States.

A small tree, 6 to 9 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; borders of streams and river sand-bars, in low, wet sandy soil, often forming low, dense clumps; rare east of the Alleghany Mountains; very common throughout the Mississippi River basin, and reaching its greatest development in the valleys of Oregon and northern California.

Forms found from western Texas to Oregon, varying in the shape of the leaves, aments, nature of pubescence, etc., are var. *exigua*, Bebb, and var. *argyrophylla*, Anders.

Wood light, soft, very close-grained, compact; medullary rays numerous, very obscure; color brown tinged with red, the sap-wood brown.

311. Salix sessilifolia, Nutt.

Puget Sound southward, near the coast, and through the California Coast Ranges.

A small tree, 9 to 12 metres in height, with a trunk rarely exceeding 0.30 to 0.45 metre in diameter; borders of streams, in low, wet ground.

A form with narrower entire leaves, of the Sacramento Valley and the California Coast Ranges, is var. *Hindsiana*, Anders.

Wood light, soft, close-grained, compact; medullary rays thin; color light red, the sap-wood nearly white.

312. Salix discolor, Muhl.

Glaucous Willow.

Labrador, west to the valleys of the Peace and Athabasca Rivers, southward through the Atlantic region to Delaware and southern Missouri.

A small tree, rarely exceeding 6 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often a tall, straggling shrub 3 to 6 metres in height; borders of streams and swamps, in low, wet soil; varying greatly in the form of leaves, aments, and nature of pubescence.

Wood light, soft, close-grained, compact, containing many evenly distributed small open ducts; medullary rays and layers of annual growth not obscure; color brown streaked with orange, the sap-wood light brown.

313. Salix flavescens, Nutt.

Willow.

Rocky Mountains of Idaho and Montana southward to southern New Mexico; on the Cascade Mountains, Oregon, and the Sierra Nevada, California.

A small tree, sometimes 6 to 9 metres in height, with a trunk rarely 0.30 metre in diameter; borders of streams, reaching its greatest development in the southern Rocky Mountain region. A form found from Alaska to California upon dry hillsides and slopes near the coast, distinguished by its broadly obovate leaves, larger size, heavier and harder wood, and dark sap-wood, is var. *Scouleriana*, Bebb.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, obscure; color brown tinged with red, the sap-wood nearly white.

314. Salix Hookeriana, Barratt.

Grand Rapids of the Saskatchewan; coast of Washington Territory and Oregon.

A small tree, 8 to 9 metres in height, with a trunk rarely 0.30 metre in diameter, or more often a low, straggling shrub with many prostrate stems; on the coast generally along the edge of beaches, or in low, rather moist, sandy soil.

Wood light, soft, close-grained, compact, containing many minute open ducts; medullary rays thin, very obscure; color light brown tinged with red, the sap-wood nearly white.

315. Salix cordata, var. vestita, Anders.

Diamond Willow.

Valley of the Missouri River and its tributaries, — Fort Osage, Missouri, Iowa, Nebraska, and westward to about the one hundred and tenth meridian.

A small tree, rarely 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or more often a low, straggling shrub, not exceeding 1.80 to 3 metres in height; bottom-lands, in wet, sandy soil. *S. cordata*, Muhl., of wide distribution through the Atlantic region, rarely, if ever, attains arborescent size or habit.

Wood light, soft, close-grained, compact, reported very durable in contact with the ground; annual layers of growth clearly defined; medullary rays very obscure; color brown or often tinged with red, the sap-wood nearly white; used for fence-posts.

316. Salix lasiolepis, Benth.

Willow

California, — valley of the Klamath River, southward through the western portions of the State, reaching in the Sierra Nevadas an elevation of 3,500 to 4,000 feet above the sea.

A small tree, sometimes 12 to 18 metres in height, with a trunk 0.45 to 0.50 metre in diameter, or northward and at high elevations reduced to a low shrub; leaves varying greatly in shape and breadth (vars. *angustifolia* and *latifolia*, Anders.), or toward its southern limit often persistent until spring (*S. Hartwegi*, Benth.).

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood nearly white; somewhat used as fuel, especially in the southern part of the State.

317. Salix Sitchensis, Sans.

Silky Willow.

Alaska, southward near the coast to Santa Barbara, California.

A low, much-branched tree, rarely exceeding 8 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or more often a straggling shrub; low, wet soil, borders of streams and ponds. A form with narrow oblanceolate leaves is var. *angustifolia*, Bebb.

Wood light, soft, close-grained, compact; medullary rays numerous, thin; color light red, the sap-wood nearly white.

318. Populus tremuloides, Michx.

Aspen. Quaking Asp.

Northern Newfoundland and Labrador to the southern shores of Hudson Bay, northwest to the Great Bear Lake, the mouth of the Mackenzie River, and the valley of the Yukon River, Alaska; south in the Atlantic region to the mountains of Pennsylvania, southern Indiana and Illinois, and northern Kentucky; in the Pacific region south to the valley of the Sacramento River, California, and along the Rocky Mountains and interior ranges to southern New Mexico, Arizona, and central Nevada.

A small tree, 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; very common through British America, and spreading over enormous areas stripped by fire of other trees; in the Pacific region very common upon moist mountain slopes and bottoms between 6,000 and 10,000 feet elevation; the most widely distributed North American tree.

Wood light, soft, not strong, close-grained, compact, not durable, containing, as does that of the whole genus, numerous minute scattered open ducts; medullary rays very thin, hardly distinguishable; color light brown, the thick sap-wood nearly white; largely manufactured into wood-pulp; in the Pacific region sometimes used for fuel, flooring, in turnery, etc.

A bitter principle in the bark causes its occasional use as a tonic in the treatment of intermittent fevers and cases of debility.

319. Populus grandidentata, Michx.

Poplar.

Nova Scotia, New Brunswick, and west through Ontario to northern Minnesota, south through the Northern States and along the Alleghany Mountains to North Carolina, extending west to middle Kentucky and Tennessee.

A tree 21 to 24 metres in height, with a trunk 0.50 to 0.75 metre in diameter; rich woods and borders of streams and swamps.

Wood light, soft, not strong, close-grained, compact; medullary rays thin, obscure; color light brown, the sap-wood nearly white; largely manufactured into wood-pulp and occasionally used in turnery, for wooden-ware, etc.

320. Populus heterophylla, L.

River Cottonwood. Swamp Cottonwood.

Connecticut, Northport, Long Island, south, generally near the coast, to southern Georgia, through the Gulf States to western Louisiana, and through Arkansas to central Tennessee and Kentucky, southern Illinois and Indiana.

A tree 24 to 27 metres in height, with a trunk 0.60 to 0.75 metre in diameter; borders of river swamps; most common and reaching its greatest development in the basin of the lower Ohio River; rare and local.

Wood light, soft, not strong, close-grained, compact; medullary rays thin, very obscure; color dull brown, the thick sap-wood lighter brown.

321. Populus balsamifera, L.

Balsam. Tacamahac. Balm of Gilead.

Straits of Belle Isle to the shores of Hudson Bay, northwest to the shores of the Great Bear Lake and the valley of the Yukon River, Alaska, south to northern New England, central Michigan and Minnesota, the Rocky Mountains and interior ranges of Montana and Idaho, Washington, and British Columbia.

A large tree, 18 to 24 metres in height, with a trunk 1.50 to 2.10 metres in diameter; very common on all islands and shores of the northern rivers; in British Columbia generally confounded with the allied *P. trichocarpa*, the range of the two species here still uncertain. A form with broader heart-shaped leaves, white on the under side, rare or unknown in a wild state, very common in cultivation, is var. *candicans*, Gray.

Wood very light, soft, not strong, close-grained, compact; medullary rays numerous, very obscure; color brown, the thick sap-wood nearly white.

The buds, as well as those of several other species, are covered with a resinous exudation, which is occasionally used medicinally as a substitute for turpentine and other balms.

322. Populus angustifolia, James.

Black Cottonwood.

Black Hills of Dakota, eastern and southwestern Montana, east Humboldt and Shoshone Mountains, Nevada, Rocky Mountains of Colorado, and on the ranges of southwestern New Mexico and eastern Arizona.

A small tree, 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; borders of streams, between 6,000 and 10,000 feet elevation.

Wood light, soft, weak, close-grained, compact; medullary rays numerous, obscure; color brown, the sap-wood nearly white.

323. Populus trichocarpa, Torr. & Gray.

Black Cottonwood. Balsam Cottonwood.

Valley of the Fraser River, British Columbia, and probably much farther north, east to the eastern base of the Bitter Root Mountains, Montana, south through Washington, western Oregon and California to the southern borders of the State.

A large tree, 24 to 60 metres in height, with a trunk 1.20 to 2.10 metres in diameter; banks of streams and bottom-lands below 6,000 feet elevation; very common and reaching its greatest development in the valleys of the lower Columbia River and the streams flowing into Puget Sound, here the largest deciduous tree of the forest.

Wood very light, soft, not strong, rather close-grained, compact; medullary rays thin, hardly distinguishable; color light dull brown, the sap-wood lighter, nearly white; in Oregon and Washington largely manufactured into staves of sugar-barrels, wooden-ware, etc.

324. Populus monilifera, Ait.

Cottonwood. Necklace Poplar. Carolina Poplar. Big Cottonwood.

Shores of Lake Champlain, Vermont, south through western New England to western Florida, west to the eastern base of the Rocky Mountains of Montana, Colorado, and New Mexico.

A large tree, 24 to 51 metres in height, with a trunk 1.20 to 2.40 metres in diameter; low, moist soil; the common cottonwood of Texas and the western plains, bordering all streams flowing east from the Rocky Mountains.

Wood very light, soft, not strong, close-grained, compact, liable to warp in drying, difficult to season; medullary rays numerous, obscure; color dark brown, the thick sap-wood nearly white; largely used in the manufacture of paper-pulp, for light packing-cases, fence-boards, and fuel.

325. Populus Fremontii, Watson.

Cottonwood.

California, valley of the upper Sacramento River, south to San Bernardino County, extending eastward in Nevada and Utah. A form distinguished by its sharply acuminate leaves, truncate at the base (var. *Wislizeni*, Watson), is common along all the larger streams from southern California, through Arizona and New Mexico, to western Texas and southern Colorado.

A large tree, 24 to 30 metres in height, with a trunk 1.20 to 1.80 metres in diameter; borders of streams; the common cottonwood of the valleys of central California.

Wood light, soft, not strong, close-grained, compact, liable to warp in drying, difficult to season; medullary rays thin, very obscure; color light brown, the sap-wood nearly white.

CONIFERÆ.

326. Libocedrus decurrens, Torr.

White Cedar. Bastard Cedar. Post Cedar. Incense Cedar.

Oregon, south along the western slopes of the Cascade and Sierra Nevada Mountains between 3,000 and 8,500 feet elevation, and through the California Coast Ranges to the San Bernardino and Cuyamaca Mountains.

A large tree, 30 to 45 metres in height, with a trunk 1.20 to 2.10 metres in diameter; slopes and valleys; common.

Wood light, soft, not strong, brittle, close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, obscure; the thin sap-wood nearly white; largely used for fencing and in the construction of water-flumes, and for interior finish, furniture, laths, shingles, etc.; often injured by a species of dry rot (*Dædalia vorax*), rendering it unfit for lumber.

327. Thuya occidentalis, L.

White Cedar. Arbor-vitæ.

New Brunswick, valley of the Saint Lawrence River to the southern shores of James Bay and southeast to Lake Winnipeg, south through the Northern States to central New York, northern Pennsylvania, central Michigan, northern Illinois, central Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina.

A tree 12 to 18 metres in height, with a trunk sometimes 1.20 to 1.50 metres in diameter; cold, wet swamps, and rocky banks of streams; very common at the North, often covering great areas of swamp.

Wood very light, soft, not strong, brittle, rather coarse-grained, compact, very durable in contact with the soil; the bands of small summer cells very thin, dark-colored; medullary rays numerous, indistinct; color light brown, turning darker with exposure, the thin sap-wood nearly white; largely used for posts, fencing, railway-ties, and shingles.

The distilled oil and a tincture of the leaves of *Thuya* have been found useful in the treatment of pulmonary and uterine complaints.

328. Thuya gigantea, Nutt.

Red Cedar. Canoe Cedar.

Alaska, south along the Coast Ranges and islands of British Columbia, through western Washington and Oregon and the Coast Ranges of northern California, extending east along the mountains of Washington to the Cœur d'Alêne, Bitter Root, and Salmon River Mountains of Idaho and the western slopes of the Rocky Mountains of northern Montana.

A large tree, 30 to 45 metres in height, with a trunk 0.90 to 3.60 metres in diameter; low, rich woods and swamps, less commonly on dry ridges and slopes below 5,200 feet elevation; common and reaching its greatest development in western Washington and Oregon; the large specimens generally hollow.

Wood very light, soft, not strong, brittle, rather coarse-grained, compact, easily worked, very durable in contact with the soil; bands of small summer cells thin, dark-colored, distinct; medullary rays numerous, obscure; color dull brown tinged with red, the thin sap-wood nearly white; largely used for interior finish, fencing, shingles, in cabinet-making and cooperage, and by the Indians of the northwest coast in the manufacture of their canoes.

329. Chamæcyparis sphæroidea, Spach.

White Cedar.

Southern Maine, south near the coast to northern Florida, and along the Gulf Coast to the valley of the Pearl River, Mississippi.

A tree 24 to 27 metres in height, with a trunk 0.60 to 1.20 metres in diameter; deep, cold swamps; rare in the Gulf States, west of the Bay of Mobile.

Wood very light and soft, not strong, close-grained, compact, easily worked, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, obscure; color light brown tinged with red, growing darker with exposure, the sap-wood lighter; largely used in boat-building, for wooden-ware, cooperage, shingles, interior finish, telegraph and fence posts, railway-ties, etc.

330. Chamæcyparis Nutkaensis, Spach.

Yellow Cypress. Sitka Cypress.

Sitka, south along the islands and Coast Ranges of British Columbia and the Cascade Mountains of Washington and Oregon to the valley of the Santian River, Oregon.

A large tree of great economic value, 30 to 38 metres in height, with a trunk 1.20 to 1.80 metres in diameter, or toward its southern limits and at high elevations much smaller; common along the coast at the sea-level to about latitude 49° 30′, then less common and only at higher elevations; within the United States hardly below 5,000 feet elevation and very rare and local; the most valuable timber tree of Alaska.

Wood light, hard, not strong, brittle, very close-grained, compact, very durable in contact with the soil, easily worked, satiny, susceptible of a beautiful polish, possessing an agreeable resinous odor; bands of small summer cells thin, not conspicuous; medullary rays thin, numerous, hardly distinguishable; color bright light clear yellow, the thin sap-wood nearly white; somewhat used in boat and ship building, for furniture, interior finish, etc.

331. Chamæcyparis Lawsoniana, Parl.

Port Orford Cedar. Oregon Cedar. White Cedar. Lawson's Cypress. Ginger Pine.

Oregon, — Coos Bay, south to the valley of the Rogue River, not extending more than thirty miles from the coast; California, — valley of the upper Sacramento River (shores of Castle and Soda Lakes, Shasta County).

A large tree of the first economic value, 45 to 61 metres in height, with a trunk 1.80 to 4 metres in diameter; rich woods, in low, moist soil, interspersed among the red fir and hemlock; most common and reaching its greatest development along the Oregon coast; local; in California very rare and local.

Wood light, hard, strong, very close-grained, compact, easily worked, very durable in contact with the ground, abounding in odoriferous resin, satiny, susceptible of a beautiful polish; layers of small summer cells thin, not conspicuous; medullary rays numerous, very obscure; color light yellow or almost white, the thin sap-wood hardly distinguishable; largely manufactured into lumber and used for interior finish, flooring, railway-ties, fence-posts, matches, and in ship and boat building; the resin strongly diuretic and a powerful insecticide.

332. Cupressus macrocarpa, Hart.

Monterey Cypress.

California, — Cypress Point, Pescadero Ranch, and Carmelo Point, near Monterey.

A tree 15 to 21 metres in height, with a trunk 1.20 to 1.80 metres in diameter; on granite rocks immediately upon the sea-coast; very local.

Wood heavy, hard, strong, rather brittle, very close-grained, compact, easily worked, very durable in contact with the soil, satiny, susceptible of a beautiful polish, odorous; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, hardly distinguishable; color clear bright brown streaked with red and yellow, the thin sap-wood light yellow.

333. Cupressus Goveniana, Gord.

Humboldt County, California, south along the coast and through the Coast Ranges into lower California.

A small tree, sometimes 12 to 15 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams and mountain slopes, in rather rich soil, or often a low shrub, occupying extensive tracts of sandy barrens or thin, rocky soil, 1 to 5 miles inland from the coast; widely but not generally distributed.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells broad, dark-colored, conspicuous; medullary rays thin, obscure; color light brown, the thick sap-wood nearly white.

334. Cupressus Macnabiana, Murr.

California, — mountains south of Clear Lake, Lake County.

A small tree, sometimes 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or more often a tall shrub branching from the ground; very rare and local.

Wood not collected.

335. Cupressus Guadalupensis, Watson.

San Francisco Mountains of New Mexico and eastern Arizona, Santa Catalina and Santa Rita Mountains, Arizona; Sierra Madre, near Saltillo, and Guadalupe Island, Mexico.

A tree 18 to 21 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rocky cañons and ridges; forming on the New Mexico and Arizona Mountains extensive forests between 5,000 and 8,000 feet elevation, generally on northern slopes; local.

Wood light, soft, very close-grained, compact, easily worked, susceptible of a good polish; bands of small summer cells broad, conspicuous; medullary rays numerous, very obscure; color gray, often faintly streaked with yellow, the thick sap-wood light yellow.

336. Juniperus Californica, Carr.

Juniper.

California, — valley of the Sacramento River south through the Coast Ranges to lower California.

A small tree, rarely 6 to 9 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or more often a tall shrub, sending up many stems from the ground; sandy barrens and dry, rocky soil.

A form (var. *Utahensis*, Engelm.) with more slender branchlets and smaller globose fruit found from the western base of the Wahsatch Mountains, Utah, to eastern California, and south through the Great Basin to southeastern California and the San Francisco Mountains, eastern Arizona, is very common in the elevated valleys and along the lower slopes of all the ranges of central and southern Utah and Nevada, and is the most generally distributed arborescent species of the region.

Wood light, soft, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark-colored, not conspicuous; medullary rays numerous, very obscure; color light brown slightly tinged with red, the sap-wood nearly white; in southern California largely used for fencing and fuel.

337. Juniperus pachyphlœa, Torr.

Juniper.

Mountains of western Texas, southern New Mexico and Arizona south of latitude 34°; in northern Mexico.

A tree 9 to 15 metres in height, with a trunk 0.60 to 1.20 metres in diameter; dry, stony slopes and ridges, generally between 2,000 and 3,000 feet elevation; the prevailing and largest juniper of the mountains of western Texas.

Wood light, soft, not strong, brittle, very close-grained, compact, susceptible of a fine polish; bands of small summer cells very thin, dark-colored, not conspicuous; medullary rays numerous, obscure; color clear light red, often streaked with yellow, the thin sap-wood nearly white.

338. Juniperus occidentalis, Hook.

Juniper.

Blue Mountains and high prairies of eastern Washington and Oregon, Cascade Mountains of Oregon, valley of the Klamath River, California, and south along the high ridges of the Sierra Nevada, between 7,000 and 10,000 feet elevation, to the San Bernardino Mountains.

A tree 9 to 15 metres in height, with a trunk 1.20 to 2.10 metres in diameter, or often a low, much-branched shrub; dry, rocky ridges and prairies, reaching its greatest development in the California Sierras.

Wood light, soft, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, not conspicuous; medullary rays numerous, very obscure; color light red or brown, the sap-wood nearly white; largely used for fencing and fuel.

A variety (var. *monosperma*, Engelm.) with smaller, generally 1-seeded berries, extends from the eastern base of Pike's Peak, Colorado, to the

mountains of western Texas, and through New Mexico and southern Arizona to southern California.

A small, stunted tree, 6 to 9 metres in height, with a trunk sometimes 0.60 metre in diameter, or often branching from the ground with many stout, contorted stems; dry, gravelly slopes between 3,500 and 7,000 feet elevation.

Wood heavier than that of the type, the layers of annual growth often eccentric; largely used for fuel and fencing.

A variety (var. *conjugens*, Engelm.) with slender branchlets and 4 ranked, closely appressed denticulate leaves and globose 1–2-seeded fruit, extends from the valley of the Colorado River, Texas, west and north.

A tree 11 to 15 metres in height, with a trunk sometimes 0.30 metre in diameter, covering with extensive forests the limestone hills of western Texas; its range not yet satisfactorily determined.

Wood light, hard, not strong, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, very obscure; color brown often streaked with red, the thin sap-wood nearly white; largely used for fencing, fuel, telegraph-poles, railway-ties, etc.

339. Juniperus Virginiana, L.

Red Cedar. Savin.

Southern New Brunswick, shores of Georgian Bay, northern Michigan, northern Wisconsin and Minnesota, south to Cape Malabar and Tampa Bay, Florida, and the valley of the Colorado River, Texas, west to eastern Nebraska, Kansas, and the Indian Territory to about the one hundredth parallel of west longitude; in the Pacific region, Rocky Mountains of Colorado to Vancouver's Island, British Columbia; not extending to western Texas, California, or Oregon; in Utah, Nevada, and Arizona rare and local.

The most widely distributed of North American *Coniferæ*, a tree 24 to 30 metres in height, with a trunk 0.60 to 1.35 metres in diameter, or toward its northern and western limits much smaller, often reduced to a low shrub; dry, gravelly ridges, and limestone hills, or in the Gulf States, especially, near the coast, in deep swamps; common and reaching its greatest development in the valley of the Red River, Texas.

Wood light, soft, not strong, brittle, very close- and straight-grained, compact, easily worked, very durable in contact with the soil, odorous; bands of small summer cells rather broad, conspicuous; medullary rays numerous, very obscure; color dull red, the thin sap-wood nearly white; largely used for posts, sills, railway-ties, interior finish, cabinet-making, and lead-pencils.

A decoction of the leaves is occasionally used as a substitute for savine cerete, and an infusion of the berries as a diuretic.

340. Taxodium distichum, Rich.

Bald Cypress. Black Cypress. Red Cypress. White Cypress. Deciduous Cypress.

Southern Delaware, south near the coast to Mosquito Inlet and Cape Romano, Florida, west through the Gulf States to the valley of the Nueces River, Texas, and through Arkansas to western Tennessee, western and northern Kentucky, southeastern Missouri, and southern Illinois and Indiana.

A large tree, 24 to 46 metres in height, with a trunk 1.80 to 4 metres in diameter; deep, submerged swamps, river bottom-lands, and pine-barren ponds; common and occupying extensive tracts in the South Atlantic and Gulf States in the neighborhood of the coast.

Wood light, soft, close, straight-grained, not strong, compact, easily worked, very durable in contact with the soil; bands of small summer cells broad, resinous, conspicuous; medullary rays numerous, very obscure; color light or dark brown, the sap-wood nearly white; largely manufactured into lumber and used for construction, cooperage, railway-ties, posts, fencing, etc., often injured, especially west of the Mississippi River, by a species of *Dædalia*, rendering it unfit for lumber.

Two varieties of cypress, black and white, are recognized by lumbermen, the wood of the former heavier than water when green, rather harder and considered more durable than the other; the unseasoned wood of the latter lighter than water, and rather lighter colored than black cypress.

341. Sequoia gigantea, Decsn.

Big Tree.

California, — western slopes of the Sierra Nevada from Placer County (Calaveras Grove) south to the southern borders of Tulare County.

A tree 76 to 119 metres in height, with a trunk 6 to 11 metres in diameter; valleys and moist swales or hollows between 4,000 and 6,000 feet elevation, growing in small, isolated groves, except toward its southern limits, here mixed with the sugar pine and red and white firs, occupying areas often several hundred acres in extent.

Wood very light, soft, weak, brittle, rather coarse-grained, compact, remarkably durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, thin; color bright clear red, turning much darker with exposure, the thin sap-wood white; formerly somewhat manufactured into lumber, and locally used for fencing, shingles, construction, etc.

342. Sequoia sempervirens, Endl.

Redwood.

California, — from the northern boundary of the State, south in the Coast Ranges to the southern border of Monterey County.

A large tree, 61 to 92 metres in height, with a trunk 2.40 to 7 metres in diameter; sides of cañons and valleys in low, wet situations, borders of streams, etc.; not appearing on dry hillsides; generally confined to slopes facing the ocean, and nowhere extending far from the coast; most generally multiplied and reaching its greatest average density north of Cape Mendocino.

Wood light, soft, not strong, very brittle, rather coarse-grained, compact, susceptible of a good polish, easily split and worked, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, very obscure; color clear light red, the thin sap-wood nearly white; largely sawed into lumber; the prevailing and most valuable building material of the Pacific coast, and in California almost exclusively used for shingles, fence-posts, telegraph-poles, railway-ties, wine-butts, tanning- and water-tanks, coffins, etc.; forms with curled or contorted grain are highly ornamental.

343. Taxus brevifolia, Nutt.

Yew.

Islands and Coast Ranges of British Columbia, through western and the mountain ranges of eastern Washington and Oregon to the western slopes of the Rocky Mountains of northern Montana; through the California Coast Ranges to the Bay of Monterey and along the western slopes of the Sierra Nevadas.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or toward its eastern limits in Idaho and Montana much smaller, often reduced to a low shrub; rare; low, rich woods and borders of streams, reaching its greatest development in western Oregon, Washington, and British Columbia.

Wood heavy, hard, strong, brittle, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays thin, numerous, very obscure; color light bright red, the thin sap-wood light yellow; used for fence-posts and by the Indians of the northwest coast for paddles, spear-handles, bows, fish-hooks, etc.

344. Taxus Floridana, Nutt.

Yew.

Western Florida, — banks of the Apalachicola River from Bristol to Aspalaga.

A small tree, 3 to 6 metres in height, with a trunk 0.15 to 0.25 metre in diameter; rare and very local.

Wood heavy, hard, very close-grained, compact; bands of small summer cells very thin, dark-colored, not conspicuous; medullary rays numerous, obscure; color dark brown tinged with red, the thin sap-wood nearly white.

345. Torreya taxifolia, Arn.

Stinking Cedar. Savin.

Western Florida, — eastern bank of the Apalachicola River from Chattahoochee to the neighborhood of Bristol.

A tree 12 to 18 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of swamps on calcareous soil; very rare and local.

Wood light, rather hard, strong, brittle, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; bands of small summer cells very thin, not conspicuous; medullary rays numerous, obscure; color clear bright yellow, the thin sap-wood much lighter; largely used locally for fence-posts, etc.

346. Torreya Californica, Torr.

California Nutmeg. Stinking Cedar.

California, — Mendocino County, and along the western slope of the Sierra Nevada to Tulare County, between 3,000 and 5,000 feet elevation.

A tree 15 to 22 metres in height, with a trunk 0.30 to 0.90 metre in diameter; borders of streams, in moist soil; rare.

Wood light, soft, not strong, very close-grained, compact, susceptible of a fine polish, very durable in contact with the soil; bands of small summer cells broad, not conspicuous; medullary rays numerous, obscure; color clear light yellow, the thin sap-wood nearly white.

347. Pinus Strobus, L.

White Pine. Weymouth Pine.

Newfoundland, northern shores of the Gulf of Saint Lawrence to Lake Nipigon and the valley of the Winnipeg River, south through the Northern States to Pennsylvania, the southern shores of Lake Michigan; "Starving rock," near La Salle, Illinois, near Davenport, Iowa (very rare and local); and along the Alleghany Mountains to northern Georgia.

A large tree, 24 to 52 metres in height, with a trunk 1.20 to 3.50 metres in diameter; sandy loam, forming extensive forests, or in the region of the great lakes often in small bodies scattered through the hardwood forests, here reaching its greatest development; north of latitude 47° and south of Pennsylvania, central Michigan, and Minnesota much smaller, less common and valuable.

Wood light, soft, not strong, very close, straight-grained, compact, easily worked, susceptible of a beautiful polish; bands of small summer cells thin, not conspicuous; resin passages small, not numerous nor conspicuous; medullary rays numerous, thin; color light brown, often slightly tinged with red, the sap-wood nearly white; more largely manufactured into lumber, shingles, laths, etc., than that of any other North American tree; the common and most valuable building material of the Northern States; largely used in cabinet-making, for interior finish, and in the manufacture of matches, wooden-ware, and for many domestic purposes.

348. Pinus monticola, Dougl.

White Pine.

Vancouver's Island, Coast and Gold Ranges of southern British Columbia, east along the mountains of northern Washington, through the Cœur d'Alêne and Bitter Root Mountains of Idaho to the valley of the Flathead River, Montana; south along the Cascade Mountains of Washington and Oregon and the California Sierras to Calaveras County.

A large tree, 30 to 46 metres in height, with a trunk 0.90 to 1.50 metres in diameter; most common and reaching its greatest development in the Pend d'Oreille and Clark's Fork regions of Idaho, here a valuable and important timber tree; in British Columbia generally below 3,000 feet, and in California between 7,000 and 10,000 feet elevation, not common.

Wood very light, soft, not strong, close, straight-grained, compact; bands of small summer cells thin, resinous, not conspicuous; resin passages numerous, not large, conspicuous; medullary rays numerous, obscure; color light brown or red, the sap-wood nearly white; inferior in quality, although resembling that of the Eastern white pine (*P. Strobus*); in Idaho and Montana somewhat manufactured into lumber.

349. Pinus Lambertiana, Dougl.

Sugar Pine.

Oregon, — Cascade and Coast Ranges, from the head of Mackenzie River and the valley of the Rogue River, south; California, — western flank of the Sierra Nevada, through the Coast Ranges to the Santa Lucia Mountains, and in the San Bernardino and Cuyamaca Mountains.

A large tree, 46 to 92 metres in height, with a trunk 3 to 7 metres in diameter; most common and reaching its greatest development upon the Sierras of central and northern California between 4,000 and 8,000 feet elevation; in the Oregon Coast Ranges descending to 1,000 feet above sea-level.

Wood very light, soft, coarse, straight-grained, compact, satiny, easily worked; bands of small summer cells thin, resinous, conspicuous; resin passages numerous, very large and conspicuous; medullary rays numerous, obscure; color light brown, the sap-wood nearly white; now largely manufactured into lumber and used for interior finish, door-blinds, sashes, etc., and for cooperage and wooden-ware; less valuable and less easily worked than that of the Eastern white pine (*Pinus Strobus*); its quality injured by the larger and more numerous resin passages.

A saccharine exudation from the stumps of cut or partially burned trees is sometimes used as a substitute for sugar.

350. Pinus flexilis, James.

White Pine.

Eastern slopes of the Rocky Mountains, Montana, and probably farther north, south to New Mexico, Guadalupe and Limpia Mountains, western

Texas, high mountain ranges of Utah, Nevada, and northern Arizona, Inyo Mountains and Mount Silliman, California.

A tree 15 to 18 metres in height, with a trunk 0.60 to 1.20 metres in diameter; dry, gravelly slopes and ridges between 4,000 and 10,000 feet elevation; common along the eastern slopes of the Rocky Mountains of northern Montana, forming open, scattered forests, and the prevailing forest tree; in central Nevada the most valuable timber tree of the region.

Wood light, soft, close-grained, compact; bands of small summer cells narrow, not conspicuous; resin passages numerous, large; medullary rays numerous, conspicuous; color light clear yellow, turning red with exposure, the sap-wood nearly white; in northern Montana, Nevada and Utah sometimes sawed into inferior lumber and used in construction and for various domestic purposes.

351. Pinus albicaulis, Engelm.

Coast Ranges of British Columbia, south along the Cascade and Blue Mountains of Washington and Oregon; California, — Scott Mountains, Mount Shasta, and along the high peaks of the Sierra Nevada to Mount San Bernardino; extending east along the high ranges of northern Washington to the eastern slope of the Rocky Mountains of northern Montana.

A small alpine tree, 6 to 12 metres in height, with a trunk rarely 0.60 metre in diameter, or at its highest elevation reduced to a low, prostrate shrub; dry, gravelly ridges at the extreme limit of tree growth, reaching in the San Bernardino Mountains an elevation of 10,500 feet.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages numerous, not large; medullary rays numerous, obscure; color light brown, the sap-wood nearly white.

352. Pinus reflexa, Engelm.

White Pine.

High mountains of southwestern New Mexico to the Santa Rita and Santa Catalina Mountains, Arizona.

A tree 24 to 30 metres in height, with a trunk sometimes exceeding 0.60 metre in diameter; rocky ridges and slopes of almost inaccessible cañons between 6,000 and 8,000 feet elevation.

Wood light, hard, not strong, close-grained, compact; bands of small summer cells thin, resinous, not conspicuous; resin passages few, large; medullary rays numerous, obscure; color light red, the sap-wood nearly white.

353. Pinus Parryana, Engelm.

Piñon. Nut Pine.

California, — Larkin's Station, 20 miles southeast of Campo, San Diego County, and in lower California.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; very rare within the limits of the United States; south of the boundary forming in lower California extensive open forests upon high ridges and slopes.

Wood light, soft, close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages very numerous, large, conspicuous; medullary rays numerous, obscure; color light brown or yellow, the sap-wood much lighter, nearly white.

The large seeds edible.

354. Pinus cembroides, Zucc.

Piñon. Nut Pine.

Santa Catalina Mountains, Arizona; in northern Mexico.

A small tree, in Arizona 6 to 7 metres in height, with a trunk hardly exceeding 0.30 metre in diameter; dry ridges and slopes at 3,500 feet elevation.

Wood light, soft, very close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages few, small; medullary rays numerous, obscure; color light clear yellow, the sap-wood nearly white.

The seeds edible.

355. Pinus edulis, Engelm.

Piñon. Nut Pine.

Eastern base of Pike's Peak, Colorado, south through New Mexico to the mountains of western Texas.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.90 metre in diameter; dry slopes, generally on lime or sandstone, reaching in Colorado an elevation of 9,000 feet.

Wood light, soft, not strong, brittle, close-grained, compact, durable in contact with the soil; bands of small summer cells thin, not conspicuous; resin passages few, small; medullary rays numerous, obscure; color light brown, the sap-wood nearly white; largely used for fuel, charcoal, fencing, etc., and in western Texas occasionally manufactured into inferior lumber.

The large seeds edible.

356. Pinus monophylla, Torr. & Frem.

Piñon. Nut Pine.

Western base of the Wahsatch Mountains, Utah, to the eastern foot-hills of the California Sierras, south along the mountain ranges of the Great Basin to the San Francisco Mountains of eastern Arizona.

A small, bushy tree, 4 to 6 metres in height, with a trunk sometimes 1 metre in diameter; dry, gravelly slopes between 3,000 and 6,000 feet elevation.

Wood light, soft, weak, brittle, close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages few, not large; medullary rays numerous, obscure; color yellow or light brown, the sap-wood nearly white; largely used for fuel and charcoal.

The large edible seeds furnish the principal food of the Indians of the Great Basin.

357. Pinus Balfouriana, Murr.

Foxtail Pine. Hickory Pine.

California, — Scott Mountains, Mount Whitney, and about the headwaters of King and Kern Rivers. A form (var. *aristata*, Engelm.), common on the mountains of southeastern California, through Nevada, northern Arizona, and southern Utah to Colorado, above 7,500 feet, and in Colorado reaching 12,000 feet elevation, is distinguished by its ovate cones, with thinner scales and shorter recurved awn-like prickles.

A small tree, 15 to 19 metres in height, with a trunk 0.60 to 0.90 metre in diameter; dry, gravelly slopes and ridges, forming upon Scott Mountains a broad belt of forest growth between 5,000 and 8,000 feet elevation.

Wood light, soft, weak, brittle, very close-grained, compact, satiny, susceptible of a good polish; bands of small summer cells very narrow, dark-colored; resin passages few, not conspicuous; medullary rays numerous, obscure.

358. Pinus resinosa, Ait.

Red Pine. Norway Pine.

Newfoundland, northern shores of the Gulf of Saint Lawrence and Lake Nipigon to the valley of the Winnipeg River, south through the Northern States to eastern Massachusetts, the mountains of northern Pennsylvania, central Michigan and Minnesota.

A large tree, 24 to 46 metres in height, with a trunk 0.60 to 1.37 metres in diameter; light sandy loam or dry rocky ridges, forming scattered groves rarely exceeding a few hundred acres in extent; common and reaching its greatest development through northern Wisconsin and Minnesota.

Wood light, not strong, hard, rather coarse-grained, compact; bands of small summer cells broad, dark-colored, very resinous; resin passages few, small, not conspicuous; medullary rays numerous, thin; color light red, the sap-wood yellow or often almost white; largely manufactured into lumber and used for all purposes of construction, flooring, piles, etc.

359. Pinus Torreyana, Parry.

California, — mouth of the Soledad River, San Diego County.

A low, short-lived, gnarled, crooked tree, 6 to 8 metres in height, with

a trunk 0.23 to 0.33 metre in diameter; crests of sandy bluffs immediately upon the sea-coast; very local and fast disappearing.

Wood light, soft, not strong, brittle, rather close-grained, compact; bands of small summer cells broad, resinous, conspicuous; resin passages small, few; medullary rays numerous, obscure; color light red, the sap-wood yellow or nearly white; locally used for fuel.

360. Pinus Arizonica, Engelm.

Yellow Pine.

Santa Rita Mountains, Santa Catalina Mountains, and probably upon other ranges of southern Arizona.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; high rocky ridges between 6,000 and 8,000 feet elevation, and forming extensive forests near the summits of the Santa Catalina Mountains.

Wood light, soft, not strong, rather brittle, close-grained, compact; bands of small summer cells broad, very resinous, conspicuous; resin passages numerous, large; medullary rays thin, obscure; color light red or often yellow, the sap-wood lighter yellow or white; sometimes sawed into inferior lumber.

361. Pinus ponderosa, Dougl.

Yellow Pine. Bull Pine.

Interior of British Columbia, south of latitude 51°, south and east along the mountain ranges of the Pacific Region to Mexico, the Black Hills of Dakota, Colorado, and western Texas; not detected in central or southern Nevada.

A large tree, 61 to 91 metres in height, with a trunk 3.60 to 4.57 metres in diameter, or throughout the Rocky Mountain region much smaller, rarely exceeding 30 metres in height (var. *scopulorum*); dry, rocky ridges and prairies, or in northern California rarely in cold, wet swamps, reaching its greatest development along the western slope of the Sierras of northern and central California; in western Washington and Oregon, rare and local; next to *Pseudotsuga Douglasii* the most generally distributed and valuable timber tree of the Pacific forests, furnishing the principal lumber of eastern Washington and Oregon, western Montana, Idaho, the Black Hills of Dakota, western Texas, New Mexico, and Arizona.

Wood varying greatly in quality and value, heavy, hard, strong, brittle, not coarse-grained nor durable, compact; bands of small summer cells broad or narrow, very resinous, conspicuous; resin passages few, small; medullary rays numerous, obscure; color light red, the very thick sap-wood almost white; largely manufactured into lumber, and used for railway-ties, fuel, etc.

362. Pinus Jeffreyi, Murr.

Bull Pine. Black Pine.

California, — Scott Mountains, south along the Sierra Nevada to the San Bernardino and San Jacinto Mountains.

A large tree, 30 to 31 metres in height, with a trunk 1.20 to 4 metres in diameter; dry, gravelly slopes between 6,000 and 8,000 feet elevation; most common and reaching its greatest development on the eastern slope of the Sierra Nevada.

Wood light, strong, hard, rather coarse-grained, compact; bands of small summer cells not broad, very resinous, conspicuous; resin passages few, not large; medullary rays numerous, obscure; color light red, the sap-wood pale yellow or nearly white; largely manufactured into coarse lumber.

Abietine, a volatile carbo-hydrogen possessing powerful anæsthetic properties, is obtained by distilling the resinous exudation of this species.

363. Pinus Chihuahuana, Engelm.

Santa Rita Mountains, Arizona, San Francisco Mountains, southwestern New Mexico and Arizona; in Chihuahua.

A small tree, 18 to 24 metres in height, with a trunk 0.45 to 0.60 metre in diameter; dry, rocky ridges and slopes between 5,000 and 7,000 feet elevation; not common.

Wood light, soft, strong, brittle, close-grained, compact; bands of small summer cells not broad, resinous, conspicuous; resin passages few, rather large, conspicuous; medullary rays numerous, thin; color clear light orange, the thick sap-wood lighter.

364. Pinus contorta, Dougl.

Scrub Pine.

Alaska, south along the coast to Mendocino County, California, extending inland to the western slopes of the Coast Ranges.

A small, stunted tree, 6 to 9 metres in height, with a trunk 0.30 to 0.50 metre in diameter; sandy dunes and exposed rocky points.

Wood light, hard, strong, brittle, coarse-grained; bands of small summer cells very broad, resinous, conspicuous; resin passages numerous, not large; medullary rays numerous, obscure; color light brown tinged with red, the thick sap-wood nearly white.

365. Pinus Murrayana, Balfour.

Tamarack. Black Pine. Lodge-pole Pine. Spruce Pine.

Valley of the Yukon River, Alaska, south through the interior of British Columbia, along the mountain ranges of Washington and Oregon and the Sierra Nevada of California to Mount San Jacinto; on the high plateau east of the Rocky Mountains in about latitude 56°, and south

through the mountains of Idaho, Montana, Wyoming, Colorado, and Utah to New Mexico and northern Arizona.

A tree 18 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; reaching its greatest development in the California Sierras; in the interior regions in dry, gravelly soil, here the prevailing tree, covering immense areas, and generally replacing other species destroyed by fire; western Washington and southward only along the borders of moist alpine meadows between 6,000 and 9,000 feet elevation.

Wood light, soft, not strong, close, straight-grained, easily worked, compact, not durable; bands of small summer cells narrow, not conspicuous; resin passages few, not large; medullary rays numerous, obscure; color light yellow or nearly white, the thin sap-wood lighter; occasionally manufactured into lumber, and used for fuel, railway-ties, etc.

366. Pinus Sabiniana, Dougl.

Digger Pine. Bull Pine.

California, — Shasta County, south along the foot-hills of the Coast Ranges and the western slope of the Sierra Nevada below 4,000 feet elevation.

A large tree, 24 to 30 metres in height, with a trunk 0.60 to 1.20 metres in diameter; very common through all the foot-hills region.

Wood light, soft, not strong, brittle, very coarse-grained, compact, not durable; bands of small summer cells broad, very resinous, conspicuous; resin passages few, large, prominent; medullary rays numerous, obscure; color light brown or red, the thick sap-wood yellow or nearly white; largely used for fuel.

The large seeds edible.

367. Pinus Coulteri, D. Don.

California, — Monte Diablo, south through the Coast Ranges to the Cuyamaca Mountains.

A tree 24 to 46 metres in height, with a trunk 0.90 to 1.80 metres in diameter; dry ridges and slopes between 3,000 and 6,000 feet elevation; most common and reaching its greatest development in the San Jacinto Mountains.

Wood light, soft, not strong, brittle, coarse-grained; bands of small summer cells broad, very resinous, conspicuous; resin passages few, large; medullary rays numerous, prominent; color light red, the thick sap-wood nearly white.

368. Pinus insignis, Dougl.

Monterey Pine.

California, — Pescadero to Monterey and San Simeon Bay.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; sandy soil, in immediate proximity to the sea-coast; rare and local.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells not broad, resinous, conspicuous; color light brown, the very thick sap-wood nearly white; locally somewhat used for fuel.

369. Pinus tuberculata, Gord.

Knob-cone Pine.

Valley of the Mackenzie River, Oregon, south along the western slope of the Cascade and Sierra Nevada Mountains, and in the California Coast Ranges from the Santa Cruz to the San Jacinto Mountains.

A tree 18 to 22 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or, rarely, reduced to a low shrub; dry, gravelly ridges and slopes from 2,500 (San Bernardino Mountains) to 5,500 (Mount Shasta) feet elevation; not common.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells very broad, not conspicuous; resin passages numerous, large, prominent; medullary rays numerous, thin; color light brown, the thick sap-wood nearly white or slightly tinged with red.

370. Pinus Tæda, L.

Loblolly Pine. Old-field Pine. Rosemary Pine.

Southern Delaware, south to Cape Malabar and Tampa Bay, Florida, generally near the coast, through the Gulf States to the valley of the Colorado River, Texas, and extending north to the valley of the Arkansas River.

A tree 24 to 46 metres in height, with a trunk 0.90 to 1.50 metres in diameter; low, wet clay or dry, sandy soil; springing up on all abandoned lands from Virginia southward, and now often replacing in the Southern pine-belt the original forests of *Pinus palustris;* in eastern North Carolina rarely on low, rich swamp ridges, here known as rosemary pine and attaining its greatest development and value.

Wood light, not strong, brittle, very coarse-grained, not durable; bands of small summer cells broad, very resinous, conspicuous; resin passages few, not prominent; medullary rays numerous, obscure; color light brown, the very thick sap-wood orange, or often nearly white; largely used for fuel and manufactured into lumber of inferior quality.

371. Pinus rigida, Mill.

Pitch Pine.

New Brunswick to the northern shores of Lake Ontario, south through the Atlantic States to northern Georgia, extending to the western slope of the Alleghany Mountains in West Virginia and Kentucky.

A tree 12 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; dry, sandy, barren soil, or less commonly in deep, cold swamps; very common.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, very resinous, conspicuous; resin passages numerous, not large; medullary rays numerous, obscure; color light brown or red, the thick sap-wood yellow or often nearly white; largely used for fuel, charcoal, and occasionally manufactured into coarse lumber.

372. Pinus serotina, Michx.

Pond Pine.

North Carolina, south near the coast to the head of the Saint John's River, Florida.

A tree 12 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; inundated borders of streams and ponds in low, peaty soil; not common.

Wood heavy, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, very resinous, dark-colored, conspicuous; resin passages few, large; medullary rays numerous, obscure; color dark orange, the thick sap-wood pale yellow.

373. Pinus inops, Ait.

Jersey Pine. Scrub Pine.

Long Island and Staten Island, New York, south, generally near the coast, to the valley of the Savannah River, South Carolina, and through eastern and middle Kentucky to southeastern Indiana.

A tree 24 to 36 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or in the Atlantic States generally much smaller; sandy, generally barren soil, reaching its greatest development west of the Alleghany Mountains.

Wood light, soft, not strong, brittle, very close-grained, compact, durable; bands of small summer cells broad, very resinous, conspicuous; resin passages few, not prominent; medullary rays numerous, thin; color light orange, the thick sap-wood nearly white; largely used for fuel, and in Kentucky and Indiana preferred for and largely manufactured into water-pipes and pump-logs.

374. Pinus clausa, Vasey.

Sand Pine. Scrub Pine. Spruce Pine.

Florida, — shores of Pensacola Bay, south, generally within 30 miles of the coast, to Pease Creek, and occupying a narrow ridge along the east coast south of Saint Augustine.

A tree 21 to 24 metres in height, with a trunk 0.60 to 0.75 metre in diameter, or on the west coast rarely 6 to 9 metres in height; barren, sandy dunes and ridges; most common and reaching its greatest development about the head of Halifax Bay.

Wood light, soft, not strong, brittle; bands of small summer cells broad, very resinous, conspicuous; resin passages numerous, prominent; medullary rays numerous, thin; color light orange or yellow, the thick sap-wood nearly white.

375. Pinus pungens, Michx. f.

Table-mountain Pine. Hickory Pine.

Alleghany Mountains, Pennsylvania to Tennessee.

A tree 9 to 18 metres in height, with a trunk 0.60 to 1.05 metres in diameter; most common and reaching its greatest development upon the high mountains of East Tennessee, here often forming extensive forests.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, resinous, conspicuous; resin passages numerous, large; medullary rays numerous, prominent; color light brown, the thick sap-wood nearly white; in Pennsylvania largely manufactured into charcoal.

376. Pinus muricata, D. Don.

Obispo Pine. Bishop's Pine.

California, — Mendocino County south through the Coast Ranges to San Luis Obispo County.

A tree 24 to 36 metres in height, with a trunk 0.30 to 0.90 metre in diameter, or more often not exceeding 15 metres in height; cold peat-bogs or barren, sandy gravel; always in situations exposed to the winds and fogs of the ocean, and not found above 2,000 feet elevation, reaching its greatest development in Mendocino County; rare and local.

Wood light, very strong and hard, rather coarse-grained, compact; bands of small summer cells broad, resinous; resin passages few, not prominent; medullary rays numerous, thin; color light brown, the thick sap-wood nearly white.

377. Pinus mitis, Michx.

Yellow Pine. Short-leaved Pine. Spruce Pine. Bull Pine.

Staten Island, New York, south to western Florida, through the Gulf States to Tennessee and eastern Texas, and through Arkansas to the Indian Territory, southeastern Kansas, southern Missouri and southern Illinois.

A tree 24 to 30 metres in height, with a trunk 0.60 to 1.35 metres in diameter; light, sandy soil or, less commonly, along the low borders of swamps; forming, west of the Mississippi River, mixed with oaks and other deciduous trees, extensive forests; the only species of northern Arkansas, Kansas, and Missouri, and reaching its greatest development in western Louisiana, southern Arkansas and eastern Texas.

Wood varying greatly in quality and amount of sap, heavy, hard, strong, generally coarse-grained, compact; bands of small summer cells broad, very resinous; resin passages numerous, large; medullary rays numerous, conspicuous; color orange, the sap-wood nearly white; largely manufactured into lumber, especially in the States west of the Mississippi River.

378. Pinus glabra, Walt.

Cedar Pine. Spruce Pine. White Pine.

South Carolina, south to middle Florida, generally near the coast, and through the Gulf States south of latitude 32° 30′ to the valley of the Pearl River, Louisiana.

A tree 24 to 30 metres in height, with a trunk 0.60 to 1.20 metres in diameter; rich bottom-lands and hummocks in dense forests of hard-wood trees, reaching its greatest development in Alabama and Mississippi; not common and very local.

Wood light, soft, not strong, brittle, very coarse-grained, not durable; bands of small summer cells broad, not resinous; resin passages few, not large; medullary rays numerous, obscure; color light brown, the sap-wood nearly white.

379. Pinus Banksiana, Lamb.

Gray Pine. Scrub Pine. Prince's Pine.

Bay of Chaleur to the southern shores of Hudson Bay, northwest to the Great Bear Lake, the valley of the Mackenzie River, and the eastern slope of the Rocky Mountains; south to northern Maine, northern Vermont, the southern shores of Lake Michigan and central Minnesota.

A small tree, 9 to 22 metres in height, with a trunk rarely exceeding 0.75 metre in diameter; barren, sandy soil or, less commonly, in rich loam; most common north of the boundary of the United States, and reaching its greatest development in the region north of Lake Superior, here often forming considerable forests; toward its extreme western limits associated and often confounded with the closely allied *P. contorta* and *P. Murrayana* of the Pacific region.

Wood light, soft, not strong, rather close-grained, compact; bands of small summer cells not broad, very resinous, conspicuous; resin passages few, not large; medullary rays numerous, obscure; color clear light brown or, rarely, orange, the thick sap-wood almost white; largely used for fuel, railway-ties, etc.

380. Pinus palustris, Mill.

Long-leaved Pine. Southern Pine. Georgia Pine. Yellow Pine. Hard Pine.

Southeastern Virginia, south to Cape Canaveral and Tampa Bay, Florida, and through the Gulf States to the valley of the Red River,

Louisiana, and the Trinity River, Texas, rarely extending beyond 150 miles from the coast.

A tree 18 to 29 metres in height, with a trunk 0.60 to 1.20 metres in diameter; dry, sandy loam of the maritime plain; forming extensive forests almost to the exclusion of other species, or toward its extreme interior range, especially in the Gulf States, occupying rolling hills, here mixed with oaks and various deciduous trees; rarely along the borders of swamps in low, wet soil.

Wood heavy, exceedingly hard, very strong, tough, coarse-grained, compact, durable; bands of small summer cells broad, very resinous, dark-colored; resin passages few, not conspicuous; medullary rays numerous, conspicuous; color light red or orange, the thin sap-wood nearly white; largely manufactured into lumber and used in construction of all sorts, for ship-building, fencing, railway-ties, etc.

The turpentine, tar, pitch, rosin, and spirits of turpentine manufactured in the United States are almost exclusively produced by this species.

381. Pinus Cubensis, Griseb.

Slash Pine. Swamp Pine. Bastard Pine. Meadow Pine.

South Carolina, south near the coast to the southern keys of Florida, west along the Gulf coast to the valley of the Pearl River, Louisiana, not extending beyond 50 or 60 miles inland; in the West Indies.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; light, sandy soil along the dunes and marshes of the coast, or wet, clay borders of ponds, abandoned fields, etc., and now rapidly taking possession of ground from which the forests of *P. palustris* have been removed; the only species of Florida south of Cape Canaveral and Bay Biscayne.

Wood heavy, exceedingly hard, very strong, tough, coarse-grained, compact, durable; bands of small summer cells very broad and resinous, conspicuous; resin passages few, not large; medullary rays numerous, rather prominent; color rich dark orange, the sap-wood lighter, often nearly white; hardly inferior in value to that of *P. palustris*, although rarely manufactured into lumber.

Turpentine is occasionally manufactured in southern Florida from this species.

382. Picea nigra, Link.

Black Spruce.

Newfoundland, northern Labrador to Ungava Bay, Nastapokee Sound and Cape Churchill, Hudson Bay, and northwest to the mouth of the Mackenzie River and the eastern slopes of the Rocky Mountains; south through the Northern States to Pennsylvania, central Michigan, central

Wisconsin and Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina.

A tree 15 to 21 metres in height, with a trunk 0.60 to 0.90 metre in diameter; light, dry, rocky soil, forming, especially north of latitude 50°, extensive forests on the water-sheds of the principal streams or in cold, wet swamps; then small, stunted, and of little value (*P. rubra*).

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells thin, resinous; resin passages few, minute; medullary rays few, conspicuous; color light red or often nearly white, the sap-wood lighter; largely manufactured into lumber, and used in construction, for ship-building, piles, posts, railway-ties, etc.

383. Picea alba, Link.

White Spruce.

Newfoundland, northern shore of Labrador to Ungava Bay, Cape Churchill, and northwestward to the mouth of the Mackenzie River and the valley of the Yukon River, Alaska; south to northern Maine, northeastern Vermont, northern Michigan and Minnesota, the Black Hills of Dakota, the Rocky Mountains of northern Montana, Sitka, and British Columbia.

A tree 15 to 50 metres in height, with a trunk 0.60 to 0.90 metre in diameter; low, rather wet soil, borders of ponds and swamps; most common north of the boundary of the United States, and reaching its greatest development along the streams and lakes of the Flathead region of northern Montana at an elevation of 2,500 to 3,500 feet; the most important timber tree of the American subarctic forests north of latitude 60°; its distribution southward in British Columbia not yet satisfactorily determined.

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells thin, not conspicuous; resin passages few, minute; medullary rays numerous, prominent; color light yellow, the sap-wood hardly distinguishable; largely manufactured into lumber, although not distinguished in commerce from that of the black spruce (*P. nigra*).

384. Picea Engelmanni, Engelm.

White Spruce.

Peace River Plateau, in latitude 55° 46′, through the interior of British Columbia and along the Cascade Mountains of Washington and Oregon to the valley of the Mackenzie River; on the principal ranges of the Rocky and Wahsatch Mountains to the San Francisco Mountains, Sierra Blanco, and Mount Graham, Arizona.

A large tree, 24 to 46 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or at its extreme elevation reduced to a low, prostrate shrub; dry, gravelly slopes and ridges between 5,000 and 11,500 feet elevation; the most valuable timber tree of the central Rocky Mountain

region, here forming extensive forests, generally above 8,500 feet elevation; rare and of small size in the mountains of Washington, Oregon, and Montana.

Wood very light, soft, not strong, very close, straight-grained, compact, satiny; bands of small summer cells narrow, not conspicuous; resin passages few, minute; medullary rays numerous, conspicuous; color pale yellow tinged with red, the sap-wood hardly distinguishable; in Colorado manufactured into lumber and largely used for fuel, charcoal, etc.

The bark, rich in tannin, is sometimes used in Utah in tanning leather.

385. Picea pungens, Engelm.

White Spruce. Blue Spruce.

Valley of the Wind River, south in the mountain ranges of Wyoming, Colorado, and Utah.

A tree 30 to 46 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams, in damp or wet soil, generally between 6,000 and 9,000 feet elevation, never forming forests; rare and local.

Wood very light, soft, weak, close-grained, compact, satiny; bands of small summer cells narrow, not conspicuous; resin passages few, small; medullary rays numerous, prominent; color very light brown or often nearly white, the sap-wood hardly distinguishable.

386. Picea Sitchensis, Carr.

Tide-land Spruce.

Alaska, south to Mendocino County, California, not extending more than 50 miles inland from the coast.

A large tree of great economic value, 46 to 61 metres in height, with a trunk 2.40 to 5.19 metres in diameter; gravelly ridges and swamps, reaching its greatest development in Washington and Oregon near the mouth of the Columbia River, here forming a belt of nearly continuous forest growth, from 10 to 50 miles in width.

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells narrow, not conspicuous; resin passages few, obscure; medullary rays numerous, rather prominent; color light brown tinged with red, the sap-wood nearly white; largely manufactured into lumber and used for construction, interior finish, fencing, boat-building, the dunnage of vessels, cooperage, wooden-ware, etc.

386 *a*. Picea species.

Alpine slopes of the Siskiyou Mountains, Oregon (*Thomas Howell*, June, 1884); probably very rare and local.

A tree sometimes exceeding 30 metres in height, with a trunk often 1 metre in diameter; the botanical characters not yet published; easily dis-

tinguished by its long pendulous branchlets, flat or slightly rounded leaves, and large cones with broad, spreading, very thin, entire scales.

Wood not collected.

387. Tsuga Canadensis, Carr.

Hemlock.

Nova Scotia, southern New Brunswick, valley of the Saint Lawrence River to the shores of Lake Temiscaming, and southwest to the western borders of northern Wisconsin; south through the Northern States to northern Delaware, southeastern Michigan, central Wisconsin, and along the Alleghany Mountains to northern Alabama.

A tree 21 to 33 metres in height, with a trunk 0.90 to 1.15 metres in diameter; dry, rocky ridges, generally facing the north and often forming extensive forests almost to the exclusion of other species, or, less commonly, borders of swamps in deep, rich soil; most common at the North, and reaching its greatest individual development in the high mountains of North Carolina and Tennessee.

Wood light, soft, not strong, brittle, coarse, crooked-grained, difficult to work, liable to wind-shake and splinter, not durable; bands of small summer cells rather broad, conspicuous; medullary rays numerous, thin; color light brown tinged with red or often nearly white, the sap-wood somewhat darker; largely manufactured into coarse lumber and used in construction for outside finish, railway-ties, etc.; two varieties, red and white, produced apparently under precisely similar conditions of growth, are recognized by lumbermen.

The bark, rich in tannin, is the principal material used in the Northern States in tanning leather, and yields a fluid extract sometimes used medicinally as a powerful astringent.

388. Tsuga Caroliniana, Engelm.

Hemlock.

Southern Alleghany region, North and South Carolina.

A small tree, 12 to 15 metres in height, with a trunk 0.60 to 0.75 metre in diameter; dry, rocky ridges between 4,000 and 5,000 feet elevation; rare and local.

Wood light, soft, not strong, brittle, coarse-grained; bands of small summer cells narrow, not conspicuous; medullary rays numerous, thin; color light brown tinged with red, the sap-wood nearly white.

389. Tsuga Mertensiana, Carr.

Hemlock.

Alaska, south along the islands and coast of British Columbia, and through the Selkirk, Gold, and other interior ranges to the Bitter Root Mountains of Idaho, and the western slopes of the Rocky Mountains of

Montana, extending south along the Cascade Mountains to southern Oregon and in the Coast Ranges between 1,000 and 4,000 feet elevation, to northern California.

A large tree, 30 to 61 metres in height, with a trunk 1.20 to 3 metres in diameter; low, moist bottoms or rocky ridges; very common and reaching its greatest development in western Oregon and Washington, often forming extensive forests, especially along the western base of the Cascade Mountains.

Wood light, hard, not strong, rather close-grained; bands of small summer cells thin, not conspicuous; medullary rays numerous, prominent; color light brown tinged with yellow, the sap-wood nearly white; occasionally manufactured into coarse lumber.

The bark, rich in tannin, is the principal material used on the northwest coast in tanning leather.

390. Tsuga Pattoniana, Engelm.

British Columbia, south along the Cascade Mountains and the California Sierras to the headwaters of the San Joaquin River, extending east along the high mountains of northern Washington to the western slopes and summits of the Cœur d'Alêne and Bitter Root Mountains of Idaho, and to northern Montana.

An alpine tree, rarely 30 metres in height, with a trunk 1.50 to 2.10 metres in diameter; dry slopes and ridges near the limits of tree growth, ranging from an elevation of 2,700 feet in British Columbia to 10,000 feet on the Sierras of central California.

Wood light, soft, not strong, close-grained, satiny, susceptible of a good polish; bands of small summer cells thin, not conspicuous; medullary rays numerous, obscure; color light brown or red, the sap-wood nearly white.

391. Pseudotsuga Douglasii, Carr.

Red Fir. Yellow Fir. Oregon Pine. Douglas Fir.

Coast Ranges and interior plateau of British Columbia south of latitude 55° N., east to the eastern slope of the Rocky Mountains in latitude 51° N.; south along the mountain ranges of Washington, Oregon, the California Coast Ranges, and the western slope of the Sierra Nevada, on the mountain ranges east to Montana, Wyoming, Colorado, and the Guadalupe Mountains of Texas; in the Wahsatch and Uintah Mountains, the ranges of northern and eastern Arizona; in northern Mexico; not detected in the interior region between the Sierra Nevada and the Wahsatch Mountains, south of the Blue Mountains of Oregon, and north of Arizona.

A large tree, 61 to 92 metres in height, with a trunk 0.83 to 3.66 metres in diameter, or in the Rocky Mountains much smaller, here rarely

30 metres in height; the most generally distributed and valuable timber tree of the Pacific region, growing from the sea-level to an elevation in Colorado of nearly 10,000 feet; often forming extensive forests, almost to the exclusion of other species, and reaching in western Oregon and Washington Territory its greatest development and value. A form with larger cones and narrower acutish leaves (var. *macrocarpa*, Engelm.) occurs in the San Bernardino and Cuyamaca Mountains of southern California, — a small tree with darker-colored, lighter, and less valuable wood.

Wood hard, strong, varying greatly with age and conditions of growth in density, quality, and amount of sap; difficult to work, durable; bands of small summer cells broad, occupying fully one half the width of the annual growth, dark-colored, conspicuous, soon becoming flinty and difficult to cut; medullary rays numerous, obscure; color varying from light red to yellow, the sap-wood nearly white; largely manufactured into lumber and used for all kinds of construction, railway-ties, piles, fuel, etc. Two varieties, red and yellow fir, distinguished by lumbermen, are dependent probably upon the age of the tree; the former coarse-grained, darker-colored, and considered less valuable than yellow fir.

The bark has proved valuable in tanning leather.

392. Abies Fraseri, Lindl.

Balsam. She Balsam.

High Mountains of North Carolina and Tennessee.

A tree 18 to 24 metres in height, with a trunk sometimes 0.60 metre in diameter; moist slopes between 5,000 and 6,500 feet elevation, often forming considerable forests; very local.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells rather broad, light-colored, not conspicuous; medullary rays numerous, thin; color light brown, the sap-wood lighter, nearly white.

393. Abies balsamea, Mill.

Balsam Fir. Balm-of-Gilead Fir.

Northern Newfoundland and Labrador to the southern shores of Hudson Bay; northwest to the Great Bear Lake and the eastern base of the Rocky Mountains; south through the Northern States to Pennsylvania, central Michigan and Minnesota, and along the Alleghany mountains to the high peaks of Virginia.

A tree 21 to 27 metres in height, with a trunk rarely exceeding 0.60 metre in diameter, or at high elevations reduced to a low, prostrate shrub (*A. Hudsonica*, Hort.); damp woods and mountain swamps.

Wood very light, soft, not strong, coarse-grained, compact, not durable; bands of small summer cells not broad, resinous, conspicuous; medullary rays numerous, obscure; color light brown, often streaked with yellow, the sap-wood lighter.

Canadian balsam or balm of fir, an aromatic liquid oleo-resin obtained from this and other species of *Abies* by puncturing the vesicles formed under the bark of the stem and branches, is used medicinally, chiefly in the treatment of chronic catarrhal affections, and in the arts.

394. Abies subalpina, Engelm.

Balsam.

Alaska, south through British Columbia and along the Cascade Mountains to northern Oregon; Blue Mountains of Oregon and on the ranges of Idaho, Montana, Wyoming, Utah, and Colorado.

A tree 24 to 40 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; mountain slopes and cañons between 4,000 (British Columbia) and 12,000 (Colorado) feet elevation; generally scattered and rarely forming the prevailing forest growth.

Wood very light, soft, not strong, rather close-grained, compact; bands of small summer cells very narrow, not conspicuous; medullary rays numerous, obscure; color light brown or nearly white, the sap-wood lighter.

395. Abies grandis, Lindl.

White Fir.

Vancouver's Island, south to northern California, near the coast; interior valleys of western Washington and Oregon south to the Umpqua River; Cascade Mountains below 4,000 feet elevation, Blue Mountains of Oregon to the eastern slope of the Cœur d'Alêne and Bitter Root Mountains, Idaho, and the western slopes of the Rocky Mountains of northern Montana.

A large tree, 61 to 92 metres in height, with a trunk 0.90 to 1.50 metres in diameter; most common and reaching its greatest development on the bottom-lands of western Washington and Oregon in rich, moist soil or on moist mountain slopes; then much smaller, rarely exceeding 30 metres in height.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells broader than in other American species, dark-colored, resinous, conspicuous; medullary rays numerous, obscure; color light brown, the sap-wood rather lighter; in western Oregon manufactured into lumber and used for interior finish, packing-cases, cooperage, etc.

396. Abies concolor, Lindl. & Gord.

White Fir. Balsam Fir.

Northern slopes of the Siskiyou Mountains, Oregon, south along the western slope of the Sierra Nevada to the San Bernardino and San Jacinto Mountains, California; high mountains of northern Arizona to the

Mogollon Range, New Mexico, northward to the Pike's Peak region of Colorado, and in the Wahsatch Mountains of Utah.

A large tree, 30 to 40 metres in height, with a trunk 1.20 to 1.50 metres in diameter; moist slopes and cañons between 3,000 and 9,000 feet elevation, reaching its greatest development in the California Sierras, varying greatly in the color and length of leaves, habit, etc., and perhaps only a southern form of the too nearly allied *A. grandis*, from which it cannot be always readily distinguished.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells narrow, resinous, not conspicuous; medullary rays numerous, obscure; color very light brown or nearly white, the sap-wood somewhat darker; occasionally manufactured into lumber and used for packing-cases, butter-tubs, and other domestic purposes.

397. Abies bracteata, Nutt.

California, — Santa Lucia Mountains.

A tree 46 to 61 metres in height, with a trunk 0.90 to 1.20 metres in diameter; moist, cold soil, occupying 4 or 5 cañons between 3,000 and 6,000 feet elevation, west of the summit of the range.

Wood heavy, not hard, coarse-grained, compact; bands of small summer cells broad, resinous, conspicuous; medullary rays numerous, obscure; color light brown tinged with yellow, the sap-wood not seen.

398. Abies amabilis, Forbes.

Valley of the Fraser River, British Columbia, south along the Cascade Mountains of Washington and Oregon.

A tree 30 to 45 metres in height, with a trunk sometimes 1.20 metres in diameter, forming extensive forests on the mountains of British Columbia between 3,500 and 5,000 feet, and upon the mountains south of the Columbia River between 3,000 and 4,000 feet elevation, here reaching its greatest development; its northern range not yet determined.

Wood light, hard, not strong, close-grained, compact; bands of small summer cells broad, resinous, dark-colored, conspicuous; medullary rays numerous, thin; color light brown, the sap-wood nearly white.

399. Abies nobilis, Lindl.

Red Fir.

Oregon, — Cascade Mountains from the Columbia River south to the valley of the upper Rogue River, summits of the Coast Range from the Columbia to the Nestucca River.

A large tree, 61 to 92 metres in height, with a trunk 2.40 to 3 metres in diameter, forming, with *A. amabilis*, extensive forests along the slopes of the Cascade Range, between 3,000 and 4,000 feet elevation; less multiplied in the Coast Ranges, but here reaching its greatest individual development.

Wood light, hard, strong, rather close-grained, compact; bands of small summer cells broad, resinous, dark-colored, conspicuous; medullary rays thin, hardly distinguishable; color light brown streaked with red, the sap-wood a little darker.

400. Abies magnifica, Murr.

Red Fir.

California, — Mount Shasta, south along the western slope of the Sierra Nevada to Kern County.

A large tree, 61 to 76 metres in height, with a trunk 2.40 to 3 metres in diameter, forming about the base of Mount Shasta extensive forests between 4,900 and 8,000 feet elevation; in the southern sierras less common, here reaching an extreme elevation of 10,000 feet.

Wood light, soft, not strong, rather close-grained, compact, satiny, durable in contact with the soil, liable to twist and warp in seasoning; bands of small summer cells broad, resinous, dark-colored, conspicuous; medullary rays numerous, thin; color light red, the sap-wood somewhat darker; largely used for fuel and occasionally manufactured into coarse lumber.

401. Larix Americana, Michx.

Larch. Black Larch. Tamarack. Hackmatack.

Northern Newfoundland and Labrador to the eastern shores of Hudson Bay, Cape Churchill, and northwest to the northern shores of the Great Bear Lake and the valley of the Mackenzie River within the Arctic Circle; south through the Northern States to northern Pennsylvania, northern Indiana and Illinois, and central Minnesota.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; moist uplands and intervale lands, or, south of the boundary of the United States, in cold, wet swamps, often covering extensive areas, here much smaller and less valuable.

Wood heavy, hard, very strong, rather coarse-grained, compact, durable in contact with the soil; bands of small summer cells broad, very resinous, dark-colored, conspicuous; resin passages few, obscure; medullary rays numerous, hardly distinguishable; color light brown, the sap-wood nearly white; preferred and largely used for the upper knees of vessels, for ship-timbers, fence-posts, telegraph-poles, railway-ties, etc.

402. Larix occidentalis, Nutt.

Tamarack.

British Columbia, Selkirk and Gold Ranges, south of latitude 53°, south along the eastern slopes of the Cascade Mountains to the Columbia River, through the mountain ranges of northern Washington Territory to the western slopes of the Rocky Mountains of Montana; Blue Mountains of Washington and Oregon.

A large tree, 30 to 45 metres in height, with a trunk 0.90 to 1.50 metres in diameter; moist mountain slopes and benches between 2,500 and 5,000 feet elevation; scattered among other trees and never exclusively forming forests; very common and perhaps reaching its greatest development in the region north of the Big Blackfoot River and in the valley of the Flathead River, Montana; the largest and most valuable timber tree of the Columbian basin.

Wood heavy, exceedingly hard and strong, rather coarse-grained, compact, satiny, susceptible of a fine polish, very durable in contact with the soil; bands of small summer cells broad, very resinous, dark-colored, conspicuous; resin passages few, obscure; medullary rays numerous, thin; color light bright red, the thin sap-wood nearly white; occasionally manufactured into lumber, but principally used for fuel, posts, railway-ties, etc.

403. Larix Lyallii, Parl.

Eastern slope of the Cascade Mountains of northern Washington, east along the boundary of the United States to northern Montana.

A low, much-branched, straggling, alpine tree, rarely exceeding 15 metres in height, with a trunk sometimes 1.50 metres in diameter; dry, rocky soil, generally upon northern exposures, and associated with *Pinus albicaulis* and *Tsuga Pattoniana* along the upper limits of tree growth between 5,500 and 7,000 feet elevation.

PALMÆ.

404. Sabal Palmetto, Lodd.

Cabbage Tree. Cabbage Palmetto.

North Carolina, south along the coast to Key Largo, Florida, extending along the Gulf coast to the Apalachicola River.

A tree 7 to 12 metres in height, with a trunk 0.60 to 0.90 metre in diameter; sandy maritime shores; very common and reaching its greatest development upon the west coast of the Florida peninsula south of Cedar Keys.

Wood light, soft; fibro-vascular bundles hard, difficult to work, dark-colored; color light brown; impervious to the attacks of the *Teredo*, and largely used for wharf-piles, etc.

405. Washingtonia filifera, Wend.

Fan-leaf Palm.

California, — from the eastern base of the San Bernardino Mountains to the valley of the Colorado River.

A tree 12 to 18 metres in height, with a trunk 0.60 to 1.05 metres in diameter, forming groves of 250 to 500 plants in the depressions of the

desert, in moist alkaline soil, or solitary and scattered near the heads of small ravines formed by watercourses; often stunted and greatly injured by fire.

Wood light, soft; fibro-vascular bundles hard, difficult to cut, dark-colored, conspicuous.

406. Thrinax parviflora, Sw.

Silk-top Palmetto.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, 9 metres in height, with a trunk rarely exceeding 0.10 metre in diameter, or in pine-barren soil often low and stemless (*P. Garberi*, Chapm.).

Wood light, soft; fibro-vascular bundles small, hard, not conspicuous; color light brown; the trunk used in making sponge- and turtle-crawls.

407. Thrinax argentea, Lodd.

Silver-top Palmetto. Brickley Thatch. Brittle Thatch.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, 7 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter.

Wood light, soft; fibro-vascular bundles small, very numerous; interior of the trunk spongy, much lighter than the exterior; used for piles, the foliage in the manufacture of ropes, for thatch, etc.

408. Oreodoxa regia, HBK.

Royal Palm.

Semi-tropical Florida, — hummocks near Cape Romano to the southern keys; in the West Indies.

A tree 18 to 30 metres in height, with a trunk 0.60 metre in diameter; rich hummocks, often forming extensive groves; in Florida rare and local.

Wood heavy, hard; fibro-vascular bundles large, very dark, conspicuous; interior of the trunk spongy, much lighter than the exterior; color brown.

LILIACEÆ.

409. Yucca canaliculata, Hook.

Spanish Bayonet.

Texas, — Matagorda Bay, and from the Brazos and Guadalupe Rivers to the Rio Grande; in northern Mexico.

A small tree, 5 to 8 metres in height, with a trunk 0.30 to 0.75 metre in diameter; dry, gravelly, arid soil.

Wood, like that of the whole genus, showing distinct marks of concentric arrangement, fibrous, spongy, heavy, difficult to cut and work; color light brown.

The bitter, sweetish fruit is cooked and eaten by the Mexicans; the root stock, as in the whole genus, is saponaceous and largely used by the Mexicans as a substitute for soap.

410. Yucca brevifolia, Engelm.

The Joshua. Joshua Tree.

Southwestern Utah, northwestern Arizona to southern Nevada, and the valley of the Mohave River, California.

A tree 6 to 12 metres in height, with a trunk 0.60 to 0.90 metre in diameter; dry, gravelly soil; forming upon the Mohave Desert, at 2,500 feet elevation, an open, straggling forest.

Wood light, soft, spongy, difficult to work; color very light brown or nearly white; sometimes manufactured into paper-pulp.

411. Yucca elata, Engelm.

Western Texas to southern Arizona and Utah; southward into Mexico.

A small tree, 3 to 5 metres in height, with a trunk 0.20 to 0.25 metre in diameter; dry, gravelly slopes.

Wood light, soft, spongy; color light brown or yellow.

412. Yucca baccata, Torr.

Spanish Bayonet. Mexican Banana.

Western Texas, south of latitude 32° N., west through New Mexico to southern Colorado and southern California; in northern Mexico.

A tree 7 to 12 metres in height, with a trunk 0.60 metre in diameter, or often much smaller, and toward the northern limits of its range stemless; forming upon the plains of Presidio County, Texas, extensive open forests.

Wood light, soft, spongy, difficult to work; color light brown.

The large juicy edible fruit is an important article of food to Mexicans and Indians; a strong coarse fibre, prepared by macerating the leaves in water, is manufactured into rope in Mexico.

THE PHYSICAL PROPERTIES

OF THE

WOODS OF THE UNITED STATES.

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THE various processes by which the physical properties of the woods of the United States were determined by Mr. Sharples, in connection with the Census investigation, are fully set forth in Vol. IX. of the final Reports of the Tenth Census. This volume may not be accessible to all persons who may have occasion to use the following tables, and the methods therefore adopted in attaining these results are here briefly described.

The specific gravity, ash, and fuel value of the wood of every indigenous arborescent species of the United States, with seven unimportant exceptions, were determined. The specific gravity was obtained by weighing carefully measured specimens, 100 millimetres long and about 35 millimetres square, previously subjected to a temperature of 100° C. until their weight became constant. The ash is given in percentages of the dry wood, and was determined by burning small blocks of the wood in a muffle furnace at a low temperature.

The relative approximate fuel value of any wood is obtained by deducting its percentage of ash from its specific gravity; and the correctness of the result thus obtained is based upon the hypothesis first proposed by Count Rumford, that the value of equal weights of all woods for fuel is the same. It would be more correct, however, to say that the fuel value of the organic matter in all woods is approximately the same.

Wood is made up of two factors, — organic matter, composed of carbon, hydrogen, and oxygen, with a small amount of nitrogen, and a still smaller amount of sulphur; and inorganic or mineral matter, — ash, as it is generally called, — without value as fuel. The specific gravity represents the weight of equal volumes of wood; and if from the specific gravity the weight of the ash, which varies greatly in different species, is deducted,

the relative fuel value will be obtained. A wood free from ash, therefore, having the specific gravity of 1.000, would represent the unit of fuel value, the specimens being free from hygroscopic water.

If the values thus obtained are multiplied by 4,000, the results will give very nearly, except in the case of some of the resinous woods, the number of units of heat which a cubic decimetre of the wood is capable of yielding, — a unit of heat being the amount required to raise one kilogramme of water one degree Centigrade. The fuel value of any wood is often modified by other conditions than its weight and percentage of ash. Perfect combustion is rarely attainable. Resinous woods, especially, are seldom perfectly consumed, much carbon escaping in the form of smoke. The moisture which always occurs in the firewood of commerce must also be considered. Wood when first cut often contains as much as 50 per cent of its weight of water, and air-dried wood may generally be expected to contain at least 20 per cent. The heat necessary to distil this is, of course, lost in combustion.

The strength and power to resist compression of the principal timbers produced in the forests of the United States were determined by Mr. Sharples in the course of the Census investigation.

A stick being supported at each end and weights being applied to it, it is bent or deflected in proportion to each addition of weight within a certain limit, which differs in different species of wood. This limit is called the elastic limit of the wood. When the elastic limit is exceeded, the ratio of deflection is in excess of that previously produced by the addition of similar weight. If the elasticity of a given stick under weights which do not strain it beyond this limit is known, the deflection of any other stick, of the same wood, may be calculated by means of the following formula: —

$$E = \frac{Pl^3}{4\,\Delta\, b\, d^3}.$$

E is the coefficient of elasticity; P, the weight applied in kilogrammes; l, the length of the stick in centimetres; b, the width of the stick in centimetres; d, the depth of the stick in centimetres; Δ, its deflection in centimetres.

Any five of these being known, the value of the sixth may be calculated. E has been determined for many woods, and its value is given in the fourth column of Table I.

If the deflection of a stick under a given weight is required, it can be obtained by using the formula

$$\Delta = \frac{Pl^3}{4\,E\, b\, d^3}.$$

It is often desirable to know what is the ultimate strength of a given stick. This is obtained by the following formula: —

$$R = \frac{3Pl}{2bd^2},$$

in which P, l, b, and d have the same value as in the preceding formulas. R is given in the fifth column of Table I. as the Modulus of Rupture. In this formula P will most generally be the unknown quantity, and can be obtained by using this formula, —

$$P = \frac{2bd^2R}{3l}.$$

Wood may be compressed in a direction either parallel or perpendicular to its fibres. The latter is known as indentation. When a stick is compressed in the direction parallel to its fibres, if its length does not exceed ten or twelve times its diameter, it generally fails by the crushing of the fibres; and the force necessary to produce such crushing is proportionate to the area of the cross-section of the stick. The figures in the sixth column of Table I. give the weight in kilogrammes necessary to produce such crushing in sticks of the different species one centimetre square. In order to find the weight any given stick will support, the number in the column should be multiplied by the number of square centimetres in the end of the stick. The force necessary to sink a punch one centimetre square to the depth of 1.27 millimetres perpendicular to the fibre of the wood of the different species, is given in the seventh column of Table I. The force necessary to produce indentation is proportionate to the surface of the punch or the surface exposed to its action.

For further information in regard to the formulas relating to the physical properties of wood, the reader is referred to: —

The Materials of Engineering. Part I. pp. 37–153. Robert H. Thurston. New York, 1883.

Treatise on the Resistance of Materials. De Volson Wood. New York, 1871.

TABLE I.

Specific Gravity, Percentage of Ash, Relative Approximate Fuel Value, Coefficient of Elasticity, Modulus of Rupture, Resistance to Pressure, and Weight per Cubic Foot of the Woods of the United States.

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
1	Magnolia grandiflora	0.6360	0.53	0.6326	90330	792	482	197	39.64
2	Magnolia glauca	0.5035	0.47	0.5011	91299	736	424	102	31.38
3	Magnolia acuminata	0.4690	0.29	0.4676	92817	671	415	107	29.23
4	Magnolia cordata	0.4139	0.32	0.4120	94073	600	410	89	25.78
5	Magnolia macrophylla	0.5309	0.35	0.5290	110854	696	489	130	33.09
6	Magnolia Umbrella	0.4487	0.20	0.4478	74865	583	366	84	27.96
7	Magnolia Fraseri	0.5003	0.28	0.4989	94462	707	418	123	31.18
8	Liriodendron Tulipifera	0.4230	0.23	0.4220	92667	657	372	82	26 36
9	Asimina triloba	0 3969	0.21	0.3961	48179	391	212	69	24.73
10	Anona laurifolia	0.5053	4.86	0.4807	50113	607	302	127	31.49
11	Capparis Jamaicensis	0.6971	4.76	0.6639	. . .	. .	. .	. .	43.44
12	Canella alba	0.9893	1.75	0.9720	111698	1026	782	573	61.65
13	Clusia flava	. . .	. .	. . .	. . .	. .	. .	. .	. . .
14	Gordonia Lasianthus	0.4728	0.76	0.4692	79414	670	387	99	29.46
15	Gordonia pubescens	. . .	. .	. . .	. . .	. .	. .	. .	. . .
16	Fremontia Californica	0.7142	1.69	0.7021	. . .	. .	. .	. .	44.50
17	Tilia Americana	0.4525	0.55	0.4500	84010	589	348	63	28.20
17[1]	Tilia Americana, var. pubescens	0.4074	0.65	0.4048	81111	560	405	59	25.39
18	Tilia heterophylla	0.4253	0.62	0.4227	84659	577	394	68	26.50
19	Byrsonima lucida	0.5888	2.46	0.5743	52503	424	391	210	36.69
20	Guaiacum sanctum	1.1432	0.82	1.1338	86324	787	737	793	71 24
21	Porliera angustifolia	1.1101	0.51	1.1044	. . .	. .	. .	. .	69.18
22	Xanthoxylum Americanum	0.5654	0.57	0.5622	. . .	. .	. .	. .	35.24
23	Xanthoxylum Clava-Herculis	0.5056	0.82	0.5015	72577	640	449	159	31.51
23[1]	Xanthoxylum Clava-Herculis, var. fruticosum	0.5967	0.76	0.5922	. . .	. .	. .	. .	31.19
24	Xanthoxylum Caribæum	0 9002	2.02	0.8820	86755	764	685	378	56.09
25	Xanthoxylum Pterota	0.7444	0.78	0.7386	. . .	. .	. .	. .	46.39
26	Ptelea trifoliata	0.8319	0.30	0.8294	. . .	. .	. .	. .	51.84
27	Canotia holacantha	0 6885	5.33	0.6518	. . .	. .	. .	. .	42.91
28	Simaruba glauca	0.4136	0.93	0.4098	93217	564	426	86	25.78
29	Bursera gummifera	0.3003	2.04	0.2942	41694	148	155	47	18 71
30	Amyris sylvatica	1.0459	0.59	1.0397	108507	1305	748	550	65.18
31	Swietenia Mahogoni	0.7282	1.09	0.7203	106272	1003	666	309	45.38
32	Ximenia Americana	0.9196	0.73	0.9129	. . .	. .	. .	. .	57.31
33	Ilex opaca	0.5818	0.76	0.5774	64317	686	419	176	36.26
34	Ilex Dahoon	0.4806	0.91	0.4762	64192	572	349	113	29.95
34[1]	Ilex Dahoon, var. myrtifolia	0.5873	0.90	0.5820	. . .	. .	. .	. .	36 60

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture.	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
35	Ilex Cassine	0.7270	0.87	0.7207	. . .	. .	. .	. .	45.31
36	Ilex decidua	0.7420	0.70	0.7368	. . .	. .	. .	. .	46.24
37	Cyrilla racemiflora	0.6784	0.42	0.6756	48828	314	. .	. .	43.28
38	Cliftonia ligustrina	0.6249	0.42	0.6223	78250	526	371	147	38.95
39	Euonymus atropurpureus	0.6592	0.58	0.6554	. . .	. .	. .	. .	41.08
40	Myginda pallens	0.9048	3.42	0.8739	. . .	. .	. .	. .	56.39
41	Schæfferia frutescens	0.7745	2.54	0.7548	. . .	. .	. .	. .	48.27
42	Reynosia latifolia	1.0715	3.20	1.0372	105005	820	839	639	66.78
43	Condalia ferrea	1.3020	8.31	1.1938	114316	904	803	649	81.14
44	Condalia obovata	1.1999	7.03	1.1155	. . .	. .	. .	. .	74.78
45	Rhamnus Caroliniana	0.5462	0.64	0.5427	74084	567	444	136	34.04
46	Rhamnus Californica	0.6000	0.58	0.5965	. . .	. .	. .	. .	37.39
47	Rhamnus Purshiana	0.5672	0.67	0.5634	91268	760	621	192	35.35
48	Ceanothus thyrsiflorus	0.5750	0.69	0.5710	. . .	. .	. .	. .	35.83
49	Colubrina reclinata	0.8208	1.75	0.8064	97656	1216	. .	. .	51.15
50	Æsculus glabra	0.4542	0.86	0.4503	64438	494	313	71	28.31
51	Æsculus flava	0.4274	1.00	0.4231	. . .	. .	. .	. .	26.64
52	Æsculus Californica	0.4080	0.70	0.4045	68216	635	365	108	31.04
53	Ungnadia speciosa	0.6332	1.17	0.6258	. . .	. .	394	149	39.46
54	Sapindus marginatus	0.8126	1.50	0.8004	82681	843	470	272	50.64
55	Sapindus Saponaria	0.8367	4.34	0.8004	. . .	. .	. .	. .	52.14
56	Hypelate paniculata	0.9533	1.25	0.9414	111144	1190	666	. .	59.41
57	Hypelate trifoliata	0.9102	1.38	0.8976	. . .	. .	439	384	56.72
58	Acer Pennsylvanicum	0.5299	0.36	0.5280	. . .	. .	. .	. .	33.02
59	Acer spicatum	0.5330	0.43	0.5307	. . .	. .	. .	. .	33.22
60	Acer macrophyllum	0.4909	0.54	0.4882	78032	684	381	102	30.59
61	Acer circinatum	0.6660	0.39	0.6634	71810	766	469	200	41.51
62	Acer glabrum	0.6028	0.30	0.6010	. . .	. .	. .	. .	37.57
63	Acer grandidentatum	0.6902	0.64	0.6858	. . .	. .	. .	. .	43.01
64	Acer saccharinum	0.6912	0.54	0.6875	146108	1149	619	257	43.08
64[1]	Acer saccharinum, var. nigrum	0.6915	0.71	0.6866	102726	962	550	252	43.09
65	Acer dasycarpum	0.5269	0.33	0.5252	110973	1019	482	181	32.84
66	Acer rubrum	0.6178	0.37	0.6155	94284	811	463	176	38.50
66[1]	Acer rubrum, var. Drummondii	0.5459	0.34	0.5440	. . .	. .	. .	. .	34.02
67	Negundo aceroides	0.4328	1.07	0.4282	58156	529	322	111	26.97
68	Negundo Californicum	0.4821	0.54	0.4795	94532	796	442	107	30.04
69	Rhus cotinoides	0.6425	0.50	0.6393	. . .	. .	. .	. .	40.04
70	Rhus typhina	0.4357	0.50	0.4335	. . .	. .	. .	. .	27.16
71	Rhus copallina	0.5273	0.60	0.5241	73647	663	377	109	32.86
71[1]	Rhus copallina, var. lanceolata	0.5184	0.85	0.5140	. . .	. .	479	126	32.31
72	Rhus venenata	0.4382	0.64	0.4354	. . .	. .	. .	. .	27.31
73	Rhus Metopium	0.7917	2.39	0.7728	105007	656	533	209	49.34
74	Pistacia Mexicana	. . .	. .	. . .	. . .	. .	. .	. .	. .
75	Eysenhardtia orthocarpa	0.8740	1.28	0.8628	. . .	. .	. .	. .	54.47
76	Dalea spinosa	0.5586	4.04	0.5312	. . .	. .	. .	. .	34.50
77	Robinia Pseudacacia	0.7333	0.51	0.7296	129238	1273	694	258	45.70
78	Robinia viscosa	0.8094	0.20	0.8078	. . .	. .	. .	. .	50.44
79	Robinia Neo-Mexicana	0.8034	0.60	0.7986	114889	909	683	271	50.07
80	Olneya Tesota	1.0602	2.29	1.0359	80822	750	360	655	66.07
81	Piscidia Erythrina	0.8734	3.38	0.8439	85079	752	597	337	54.43
82	Cladrastis tinctoria	0.6278	0.28	0.6260	100226	902	534	183	39.12
83	Sophora secundiflora	0.9842	1.59	0.9686	. . .	. .	. .	. .	61.34
84	Sophora affinis	0.8509	0.78	0.8443	97694	811	570	334	53.08
85	Gymnocladus Canadensis	0.6934	0.67	0.6888	104822	771	400	160	43.21
86	Gleditschia triacanthos	0.6740	0.80	0.6686	108579	923	500	168	42.00

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87	Gleditschia monosperma	0.7342	0.73	0.7288	116901	1027	584	276	45.76
88	Parkinsonia Torreyana	0.6531	1 12	0.6458	55830	646	417	226	40.70
89	Parkinsonia microphylla	0.7449	3.64	0.7178	. . .	. .	. .	. .	46.42
90	Parkinsonia aculeata	0.6116	2.32	0.5974	. . .	. .	. .	. .	38.11
91	Cercis Canadensis	0.6363	0.72	0.6317	68798	726	469	182	39.65
92	Cercis reniformis	0.7513	0.77	0.7455	. . .	. .	. .	. .	46 82
93	Prosopis juliflora	0.7652	2.18	0.7485	58297	485	588	343	47.69
94	Prosopis pubescens	0.7609	0.95	0.7537	82424	894	671	329	47 42
95	Leucæna glauca	0.9235	3.29	0.8931	. . .	. .	. .	. .	57.55
96	Leucæna pulverulenta	0 6732	1 01	0.6664	. . .	. .	. .	. .	41.95
97	Acacia Wrightii	0.9392	0 63	0.9333	. . .	. .	. .	. .	58.53
98	Acacia Greggii	0.8550	0.91	0.8472	108507	792	743	. .	53.28
99	Acacia Berlandieri	. . .	. .	. . .	. . .	. .	. .	. .	. .
100	Lysiloma latisiliqua	0.6418	2.12	0.6282	46064	553	481	171	40.00
101	Pithecolobium Unguis-cati	0.9049	2.46	0.8826	. . .	. .	. .	. .	56.39
102	Chrysobalanus Icaco	0.7709	0.87	0.7642	110973	961	. .	221	48 04
103	Prunus Americana	0.7215	0.18	0.7202	82659	864	588	213	44 96
104	Prunus angustifolia	0.6884	0.28	0.6865	60281	468	402	133	42 90
105	Prunus Pennsylvanica	0.5023	0.40	0 5003	. . .	. .	407	103	31 30
106	Prunus umbellata	0.8202	0.12	0.8192	. . .	. .	498	342	51.11
107	Prunus emarginata, var. mollis	0.4502	0 21	0.4493	86055	679	460	80	28.06
108	Prunus serotina	0.5822	0.15	0.5818	85833	829	547	204	36.28
109	Prunus Capuli	0.7879	0.20	0.7863	. . .	. .	538	272	49.10
110	Prunus demissa	0 6951	0.50	0.6916	76805	691	510	246	43.32
111	Prunus Caroliniana	0.8688	0.41	0.8652	93727	928	562	318	54.14
112	Prunus sphærocarpa	0.8998	0.87	0.8920	. . .	. .	. .	. .	56.08
113	Prunus ilicifolia	0 9803	0.78	0 9727	73201	782	544	305	61.09
114	Vanquelinia Torreyi	1.1374	1.45	1.1209	. . .	. .	. .	. .	70.88
115	Cercocarpus ledifolius	1.0731	1.04	1 0619	. . .	. .	655	480	66.88
116	Cercocarpus parvifolius	0.9365	0.45	0.9323	. . .	. .	. .	. .	58.36
117	Pyrus coronaria	0.7048	0.52	0.7011	64241	485	419	250	43.92
118	Pyrus angustifolia	0.6895	0.33	0.6872	. . .	. .	. .	. .	42.97
119	Pyrus rivularis	0.8316	0 41	0.8282	. . .	. .	. .	. .	51.83
120	Pyrus Americana	0.5451	0 83	0 5406	. . .	. .	380	117	33.97
121	Pyrus sambucifolia	0.5928	0.35	0.5908	62000	445	383	107	36 94
122	Cratægus rivularis	0.7708	0.35	0.7676	. . .	. .	. .	. .	48 00
123	Cratægus Douglasii	0.6950	0.33	0.6927	. . .	. .	. .	. .	43.31
124	Cratægus brachyacantha	0.6793	0.42	0.6764	. . .	. .	. .	. .	42.33
125	Cratægus arborescens	0.6491	0.56	0.6454	78837	621	498	184	40.45
126	Cratægus Crus-galli	0.7194	0.56	0.7154	66496	653	430	210	44.83
127	Cratægus coccinea	0.8618	0.38	0.8585	. . .	. .	. .	. .	53.71
128	Cratægus subvillosa	0.7953	0.69	0.7898	90023	738	538	263	49.56
129	Cratægus tomentosa	0.7585	0.52	0 7546	73160	709	445	240	47.57
129[1]	Cratægus tomentosa, var. punctata	0.7681	0.47	0.7645	. . .	. .	. .	. .	47.87
130	Cratægus cordata	0.7298	0.46	0.7259	. . .	. .	. .	. .	45 45
131	Cratægus apiifolia	0.7453	0.97	0.7381	. . .	. .	. .	. .	46.45
132	Cratægus spathulata	0.7159	0.66	0.7112	67849	506	455	218	44.61
133	Cratægus berberifolia	. . .	. .	. . .	. . .	. .	. .	. .	. .
134	Cratægus æstivalis	0.6564	0.57	0.6527	59185	712	445	224	40 91
135	Cratægus flava	0.7809	0.79	0 7747	. . .	. .	. .	. .	48.67
135[1]	Cratægus flava, var. pubescens	0.7683	0.91	0 7613	70765	724	527	319	47.88
136	Heteromeles arbutifolia	0.9326	0.54	0.9276	. . .	. .	. .	. .	58.12
137	Amelanchier Canadensis	0 7838	0.55	0.7795	119677	1132	670	280	48.85
138	Hamamelis Virginica	0.6856	0 37	0.6831	. . .	. .	. .	. .	42 73
139	Liquidambar Styraciflua	0.5909	0.61	0.5873	86388	651	466	132	36.82

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140	Rhizophora Mangle	1.1617	1.82	1.1406	165567	1207	860	462	72.40
141	Conocarpus erecta	0.9900	0.32	0.9868	102411	942	599	370	61.70
142	Laguncularia racemosa	0.7187	1.62	0.7021	72396	518	449	149	44.48
143	Calyptranthes Chytraculia	0.8992	3.32	0.8693	. . .	. .	. .	. .	56.04
144	Eugenia buxifolia	0.9369	1.50	0.9220	157510	1055	887	396	58.38
145	Eugenia dichotoma	0.8983	0.74	0.8917	. . .	. .	. .	. .	55.97
146	Eugenia monticola	0.9156	1.89	0.8983	108507	1172	553	408	57.06
147	Eugenia longipes	1.1235	3.48	1.0844	. . .	. .	. .	. .	70.02
148	Eugenia procera	0.9453	2.62	0.9205	119111	1176	672	444	58.91
149	Cereus giganteus	0.3188	3.45	0.3078	. . .	. .	. .	. .	19.87
150	Cornus alternifolia	0.6636	0.41	0.6609	. . .	. .	. .	. .	41.73
151	Cornus florida	0.8153	0.67	0.8098	82112	904	524	305	50.81
152	Cornus Nuttallii	0.7481	0.50	0.7444	103081	991	663	242	46.62
153	Nyssa capitata	0.4613	0.34	0.4597	68083	682	431	155	28.75
154	Nyssa sylvatica	0.6356	0.52	0.6323	81832	880	468	196	39.61
155	Nyssa uniflora	0.5194	0.70	0.5158	51678	655	365	161	32 37
156	Sambucus glauca	0.5087	1.57	0.5007	30617	370	275	138	31.70
157	Sambucus Mexicana	0.4614	2.00	0.4522	. . .	. .	. .	. .	28.75
158	Viburnum Lentago	0.7303	0.29	0.7282	. . .	. .	555	. .	45.51
159	Viburnum prunifolium	0.8332	0.52	0.8289	90654	951	592	318	51.93
160	Exostema Caribæum	0.9310	0.23	0.9289	119357	1005	751	481	58.02
161	Pinckneya pubens	0.5350	0.41	0.5328	68291	405	272	105	33.34
162	Genipa clusiæfolia	1.0316	1.06	1.0207	. . .	. .	. .	. .	64.29
163	Guettarda elliptica	0.8337	1.05	0.8250	. . .	. .	. .	. .	51.96
164	Vaccinium arboreum	0.7610	0.39	0.7580	. . .	. .	399	279	47.43
165	Andromeda ferruginea	0.7560	0.46	0.7465	81380	679	487	225	46.74
166	Arbutus Menziesii	0.7052	0.40	0.7024	82834	907	502	207	43.95
167	Arbutus Xalapensis	0.7099	0.26	0.7081	61577	618	401	247	44.24
168	Arbutus Texana	0.7500	0.51	0.7462	. . .	. .	. .	. .	46.74
169	Oxydendrum arboreum	0.7458	0.37	0.7430	88851	728	501	201	46.48
170	Kalmia latifolia	0.7169	0.41	0.7131	58484	639	430	202	44.62
171	Rhododendron maximum	0.6303	0.36	0.6280	64578	603	439	191	39 28
172	Myrsine Rapanea	0.8241	0.81	0.8271	. . .	. .	. .	. .	51.98
173	Ardisia Pickeringia	0.8602	1.84	0.8444	. . .	. .	. .	. .	53.61
174	Jacquinia armillaris	0.6918	3.45	0.6708	. . .	. .	. .	. .	43.30
175	Chrysophyllum oliviforme	0.9360	1 24	0.9244	112424	857	598	382	58.33
176	Sideroxylon Mastichodendron	1.0109	5 14	0.9589	109948	970	650	355	63.00
177	Dipholis salicifolia	0.9316	0 32	0.9286	133393	1148	720	274	58.06
178	Bumelia tenax	0.7293	0.78	0.7236	75120	673	452	181	45 45
179	Bumelia lanuginosa	0.6544	1.23	0.6464	48334	387	302	160	40.78
180	Bumelia spinosa	0 6663	1.24	0.6521	. . .	. .	. .	. .	41.15
181	Bumelia lycioides	0.7467	0.81	0.7407	78125	562	489	220	46.53
182	Bumelia cuneata	0.7959	1.90	0.7808	60281	515	478	286	49.60
183	Mimusops Sieberi	1.0838	2.61	1.0555	100226	914	460	375	67.64
184	Diospyros Virginiana	0.7908	0.96	0.7832	78234	879	503	324	49.28
185	Diospyros Texana	0.8409	3 33	0.8178	. . .	. .	. .	. .	52.72
186	Symplocos tinctoria	0.5325	0.68	0.5289	62202	619	384	159	33.19
187	Halesia diptera	0.5705	0.42	0.5681	68321	857	434	197	35.55
188	Halesia tetraptera	0.5628	0.40	0.5605	. . .	. .	. .	. .	35.07
189	Fraxinus Greggii	0.7004	0.93	0.7830	. . .	. .	. .	. .	49.26
190	Fraxinus anomala	0.6597	0.85	0 6541	. . .	. .	. .	. .	41.11
191	Fraxinus pistaciæfolia	0.6810	0.62	0.6768	60119	622	385	210	42.44
192	Fraxinus Americana	0.6543	0 42	0.6516	101068	861	463	171	40.78
192¹	Fraxinus Americana, var. Texensis	0.7626	0.70	0 7583	108174	1125	541	198	47 59
193	Fraxinus pubescens	0.6251	0.26	0.6235	81224	869	435	204	38.96

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194	Fraxinus viridis	0.7117	0.65	0.7071	90313	895	482	220	44.35
194¹	Fraxinus viridis, var. Berlandieriana	0.5780	0.54	0.5749	. . .	. .	. .	. .	36.02
195	Fraxinus platycarpa	0.3541	0.73	0.3515	47637	536	251	138	22.07
196	Fraxinus quadrangulata	0.7184	0.78	0.7128	77439	811	499	222	44.77
197	Fraxinus Oregana	0.5731	0.34	0.5712	84818	665	520	166	35.72
198	Fraxinus sambucifolia	0.6318	0.72	0.6273	87185	806	423	194	39.37
199	Forestiera acuminata	0.6345	0.72	0.6299	70282	717	401	170	39.54
200	Chionanthus Virginica	0.6372	0.51	0.6340	. . .	. .	. .	. .	39.71
201	Osmanthus Americanus	0.8111	0.46	0.8074	123133	1051	547	247	50.55
202	Cordia Sebestena	0 7108	4.22	0.6808	. . .	. .	. .	. .	44.30
203	Cordia Boissieri	0.6790	3.53	0 6550	. . .	. .	. .	. .	42.32
204	Bourreria Havanensis	0.8073	2 79	0.7848	99640	944	575	294	50.31
205	Ehretia elliptica	0.6440	1.32	0.6355	39697	721	387	229	40.13
206	Catalpa bignonioides	0.4474	0.38	0.4457	68161	590	364	77	27.88
207	Catalpa speciosa	0.4165	0.39	0.4149	82156	635	407	86	25.96
208	Chilopsis saligna	0.5902	0 87	0.5880	54421	578	297	144	36.78
209	Crescentia cucurbitina	0.6319	1.35	0.6234	. . .	. .	. .	. .	39.38
210	Citharexylum villosum	0.8710	0.52	0.8665	125717	937	689	308	54.28
211	Avicennia nitida	0.9138	2.51	0.8909	. . .	. .	. .	. .	56.95
212	Pisonia obtusata	0.6529	7.62	0.6031	46503	297	310	108	40.69
213	Coccoloba Floridana	0.9835	5.03	0.9340	115588	918	771	394	61.29
214	Coccoloba uvifera	0.9635	1.37	0.9503	. . .	. .	258	. .	60.05
215	Persea Carolinensis	0 6429	0.76	0.6380	83900	902	573	199	40.07
215¹	Persea Carolinensis, var. palustris	0.6396	0.37	0.6372	84918	820	367	192	39.86
216	Nectandra Willdenoviana	0 7693	0.60	0.7647	. . .	. .	. .	. .	47.94
217	Sassafras officinale	0.5042	0.10	0.5037	51910	602	382	134	31.42
218	Umbellularia Californica	0.6517	0 39	0 6492	106766	806	568	199	40.61
219	Drypetes crocea	0.9209	6.14	0.8844	103890	796	650	302	57.39
219¹	Drypetes crocea, var. latifolia	0.9346	8 29	0.8571	83619	707	520	407	58.24
220	Sebastiania lucida	1.0905	2.78	1 0002	. . .	. .	. .	. .	67.96
221	Hippomane Mancinella	0.5772	5.16	0.5474	. . .	. .	. .	. .	35.97
222	Ulmus crassifolia	0.7245	1.20	0.7158	70399	773	453	255	45.15
223	Ulmus fulva	0.6956	0.83	0.6898	95274	869	539	150	43.35
224	Ulmus Americana	0.6503	0.80	0.6454	74742	852	446	170	40.55
225	Ulmus racemosa	0.7263	0 60	0 7219	100628	1066	592	205	45.26
226	Ulmus alata	0 7491	0.99	0.7417	52828	724	449	255	46 68
227	Planera aquatica	0.5294	0.45	0.5270	55167	621	394	146	32.99
228	Celtis occidentalis	0.7287	1.09	0.7208	68527	789	421	217	45.41
228¹	Celtis occidentalis, var. reticulata	0.7275	1.22	0.7186	86805	805	437	273	45.34
229	Ficus aurea	0.2016	5.03	0.2484	25699	239	162	61	16.30
230	Ficus brevifolia	0.6398	4.36	0.6119	. . .	. .	. .	. .	39.87
231	Ficus pedunculata	0.4739	4.02	0.4506	40690	280	281	119	29.53
232	Morus rubra	0 5898	0.71	0.5856	82377	775	420	178	36 76
233	Morus microphylla	0.7715	0 68	0.7663	. . .	. .	. .	. .	48.08
234	Maclura aurantiaca	0.7736	0.68	0.7683	94373	1131	809	363	48.21
235	Platanus occidentalis	0.5678	0.46	0.5652	86402	635	450	165	35.39
236	Platanus racemosa	0 4880	1.11	0.4826	62401	562	324	93	30.41
237	Platanus Wrightii	0.4736	1.35	0.4672	45644	428	327	117	29.51
238	Juglans cinerea	0.4086	0.51	0.4065	81253	597	392	90	25.46
239	Juglans nigra	0.6115	0.79	0.6067	109200	856	583	196	38 11
240	Juglans rupestris	0.6554	1.01	0.6488	72632	600	437	182	40.84
241	Carya oliviæformis	0.7180	1.13	0.7099	66646	578	434	232	44.75
242	Carya alba	0.8372	0.73	0.8311	138839	1200	625	271	52.17
243	Carya sulcata	0.8108	0.90	0.8035	103284	1083	559	288	50.53
244	Carya tomentosa	0.8218	1.06	0.8131	114995	1129	593	277	51.21

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245	Carya porcina	0.8217	0.99	0.8136	103300	1046	577	301	51.21
246	Carya amara	0.7552	1.03	0.7474	102986	1101	522	242	47.06
247	Carya myristiciæformis	0.8016	1.06	0.7931	146484	1394	638	315	49.96
248	Carya aquatica	0.7407	1.27	0.7313	101261	884	486	274	46.16
249	Myrica cerifera	0.5637	0.51	0.5608	88778	815	445	144	35.13
250	Myrica Californica	0.6703	0.33	0.6681	99161	1036	532	188	41.77
251	Quercus alba	0.7470	0.41	0.7439	97089	905	511	213	46.35
252	Quercus lobata	0.7409	0.30	0.7387	71664	864	424	188	46.17
253	Quercus Garryana	0.7453	0.39	0.7424	81109	879	505	240	46.45
254	Quercus obtusiloba	0.8367	0.79	0.8301	83257	872	487	276	52.14
255	Quercus undulata, var. Gambelii	0.8407	0.99	0.8324	57162	680	417	255	52.39
256	Quercus macrocarpa	0.7453	0.71	0.7400	92929	982	491	233	46.45
257	Quercus lyrata	0.8313	0.65	0.8259	133438	1025	492	252	51.81
258	Quercus bicolor	0.7662	0.58	0.7618	90636	909	490	221	47.75
259	Quercus Michauxii	0.8039	0.45	0.8003	96373	1118	482	233	50.10
260	Quercus Prinus	0.7499	0.77	0.7441	125473	1031	538	230	46.78
261	Quercus prinoides	0.8005	1.14	0.8507	112461	1238	575	264	53.63
262	Quercus Douglasii	0.8928	0.84	0.8853	77106	993	557	374	55.64
263	Quercus oblongifolia	0.9441	2.61	0.9195	85739	719	434	439	58.84
264	Quercus grisea	1.0092	1.82	0.9908	73982	937	479	364	62.89
265	Quercus reticulata	0.9479	0.52	0.9430	...	..	..	..	59.07
266	Quercus Durandii	0.9507	1.78	0.9338	83766	993	534	308	59.25
267	Quercus virens	0.9501	1.14	0.9393	113627	1017	547	324	59.21
268	Quercus chrysolepis	0.8493	0.60	0.8442	119810	1268	545	317	52.93
269	Quercus Emoryi	0.9263	2.86	0.9044	63828	703	422	415	57.78
270	Quercus agrifolia	0.8253	1.28	0.8147	95276	935	463	285	51.43
271	Quercus Weslizeni	0.7855	1.02	0.7775	86055	818	533	272	48.95
272	Quercus rubra	0.6540	0.26	0.6523	112708	990	511	177	40.76
272[1]	Quercus rubra, var Texana	0.9080	0.85	0.9003	103343	1024	582	291	56.59
273	Quercus coccinea	0.7405	0 19	0.7391	108507	1054	504	202	46.15
274	Quercus tinctoria	0.7045	0.28	0.7025	103427	1041	501	202	43.90
275	Quercus Kelloggii	0.6435	0.26	0.6418	74488	768	449	174	40.10
276	Quercus nigra	0.7324	1.16	0.7239	97656	1043	497	286	45.64
277	Quercus falcata	0.6928	0.25	0.6911	140151	1193	596	201	43.18
278	Quercus Catesbæi	0.7294	0.87	0.7231	103468	1046	457	228	45.46
279	Quercus palustris	0.6938	0.81	0.6882	112206	1080	491	190	43.24
280	Quercus aquatica	0.7244	0.51	0.7207	122657	1052	501	198	45.14
281	Quercus laurifolia	0.7673	0.82	0.7610	125916	1181	526	253	47.82
282	Quercus heterophylla	0.6834	0.17	0.6822	122494	1073	412	182	42.59
283	Quercus cinerea	0.6420	1.21	0.6342	75120	993	448	201	40.01
284	Quercus hypoleuca	0.8009	1.34	0.7902	94409	1113	293	272	49.91
285	Quercus imbricaria	0.7529	0.43	0.7497	119357	1218	552	226	46.92
286	Quercus Phellos	0.7472	0.50	0.7435	78440	989	390	216	46.57
287	Quercus densiflora	0.6827	1.49	0.6725	96347	946	475	224	42.55
288	Castanopsis chrysophylla	0.5574	0.35	0.5554	101195	741	435	119	34.74
289	Castanea pumila	0.5887	0.12	0.5880	114108	991	495	118	36 69
290	Castanea vulgaris, var. Americana	0.4504	0.18	0.4496	85621	696	381	106	28.07
291	Fagus ferruginea	0.6883	0.51	0.6848	120996	1148	478	196	42.89
292	Ostrya Virginica	0.8284	0.50	0.8243	137276	1134	542	231	51.63
293	Carpinus Caroliniana	0.7286	0.83	0.7226	114881	1149	498	213	45.41
294	Betula alba, var. populifolia	0.5760	0.29	0.5743	72970	778	348	129	35.90
295	Betula papyrifera	0.5955	0.25	0.5940	130557	1065	487	126	37.11
296	Betula occidentalis	0.6030	0.30	0.6012	92424	806	391	127	37.58
297	Betula lutea	0.6553	0.31	0.6533	161723	1248	619	161	40.84
298	Betula nigra	0.5762	0.35	0.5742	111322	972	438	132	35.91

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299	Betula lenta	0.7617	0.26	0.7597	141398	1216	619	226	47.47
300	Alnus maritima	0.4996	0.39	0.4977	. . .	..	..	129	31.14
301	Alnus rubra	0.4813	0.42	0.4793	106046	811	415	117	29.99
302	Alnus rhombifolia	0.4127	0.31	0.4104	84580	682	356	78	25.72
303	Alnus oblongifolia	0.3981	0.42	0.3964	76937	686	278	74	24 81
304	Alnus serrulata	0.4666	0.38	0.4648	. . .	..	..	..	29.08
305	Alnus incana	0.4607	0.42	0.4588	108507	820	289	..	28.71
305[1]	Alnus incana, var. virescens	. . .	..	. . .	. . .	..	..	..	..
306	Salix nigra	0.4456	0.70	0.4425	39062	424	213	93	27.77
307	Salix amygdaloides	0.4509	0.92	0.4468	50144	550	264	81	28.10
308	Salix lævigata	0.4872	0.58	0.4844	48828	644	319	118	30.36
309	Salix lasiandra	0.4756	0.60	0.4727	. . .	..	..	..	29.64
309[1]	Salix lasiandra, var. lancifolia	0.4547	0.79	0.4411	87935	675	341	87	28.34
309[2]	Salix lasiandra, var. Fendleriana	0.4598	0.56	0.4572	80517	469	286	82	28.65
310	Salix longifolia	0.4930	0.48	0.4906	. . .	..	..	..	30.72
310[1]	Salix longifolia, var. exigua	0.5342	1.06	0.5285	. . .	..	..	..	33.29
310[2]	Salix longifolia, var. argyrophylla	. . .	..	. . .	. . .	..	..	..	..
311	Salix sessilifolia	0.4307	0.50	0.4375	. . .	..	..	..	27.40
311[1]	Salix sessilifolia, var. Hindsiana	. . .	..	. . .	. . .	..	..	..	..
312	Salix discolor	0.4261	0.43	0.4243	. . .	..	..	..	26.55
313	Salix flavescens	0.4969	0.61	0.4939	108507	808	408	98	30.97
313[1]	Salix flavescens, var. Scouleriana	0.5412	0.39	0.5391	126216	909	468	126	33.73
314	Salix Hookeriana	0.5350	0.32	0.5338	. . .	..	427	111	33.34
315	Salix cordata, var. vestita	0.6069	0 59	0.6033	. . .	..	..	..	37.82
316	Salix lasiolepis	0.5587	0.98	0.5532	88778	813	385	140	34.82
317	Salix Sitchensis	0.5072	0.59	0.5042	. . .	..	..	..	31.61
318	Populus tremuloides	0.4032	0.55	0.4010	81441	677	330	80	25.13
319	Populus grandidentata	0.4632	0.45	0.4611	96327	721	358	62	28.87
320	Populus heterophylla	0.4089	0.81	0.4056	72338	642	283	86	25.48
321	Populus balsamifera	0.3635	0.66	0.3611	85690	550	320	75	22.65
321[1]	Populus balsamifera, var. candicans	0.4161	0.46	0.4142	73024	609	276	64	25.93
322	Populus angustifolia	0.3912	0.79	0.3881	45847	400	271	76	24.38
323	Populus trichocarpa	0.3814	1.27	0.3766	111094	665	390	63	23.77
324	Populus monilifera	0.3889	0.96	0.3852	99417	770	353	83	24.24
325	Populus Fremontii	0.4914	0.77	0.4876	105116	698	378	86	30.62
325[1]	Populus Fremontii, var. Wislizeni	0.4621	1.13	0.4569	84317	691	372	100	28.80
326	Libocedrus decurrens	0.4017	0.08	0.4014	84729	682	403	98	25.03
327	Thuya occidentalis	0.3164	0.37	0.3152	53311	512	306	60	19 72
328	Thuya gigantea	0.3796	0.17	0.3790	103372	749	450	70	23.66
329	Chamæcyparis sphæroidea	0.3222	0.33	0.3211	40410	456	259	67	20.70
330	Chamæcyparis Nutkaensis	0.4782	0.34	0.4766	102881	801	455	101	29.80
331	Chamæcyparis Lawsoniana	0.4621	0.10	0.4616	121772	888	466	82	28.80
332	Cupressus macrocarpa	0.6261	0 57	0.6225	107327	1045	..	237	39.02
333	Cupressus Goveniana	0.4689	0.45	0 4668	49941	539	359	178	29.22
334	Cupressus Macnabiana	. . .	..	. . .	. . .	..	..	..	..
335	Cupressus Guadalupensis	0.4843	0.44	0.4822	. . .	..	..	..	30.18
336	Juniperus Californica	0.6282	0.75	0.6235	. . .	..	..	..	39.15
336[1]	Juniperus Californica, var. Utahensis	0.5522	0.49	0.5495	. . .	..	..	..	34.41
337	Juniperus pachyphlœa	0.5829	0.11	0 5823	61275	761	..	..	36.32
338	Juniperus occidentalis	0.5765	0.12	0.5758	. . .	..	..	186	35.93
338[1]	Juniperus occidentalis, var. monosperma	0.7118	0.78	0.7062	. . .	..	..	..	44 26
338[2]	Juniperus occidentalis, var. conjugens	0.6907	0.46	0.6875	73426	468	532	286	43.04
339	Juniperus Virginiana	0.4926	0.13	0.4920	66992	740	416	148	30.70
340	Taxodium distichum	0.4543	0.42	0.4524	103206	682	423	81	28.31

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341	Sequoia gigantea	0 2882	0.50	0.2868	45146	459	388	68	17.96
342	Sequoia sempervirens	0.4208	0.14	0.4202	67646	597	416	77	26.22
343	Taxus brevifolia	0 6391	0.22	0.6377	76133	1078	483	264	39.83
344	Taxus Floridana	0.6340	0.21	0 6327	. . .	..	..	..	39.51
345	Torreya taxifolia	0.5145	0.73	0.5107	82883	887	460	158	32.06
346	Torreya Californica	0.4760	1.34	0.4690	40146	583	351	122	29 66
347	Pinus Strobus	0.3854	0.19	0.3847	85093	626	339	74	24.02
348	Pinus monticola	0.3908	0.23	0.3899	95068	600	334	67	24.35
349	Pinus Lambertiana	0.3684	0.22	0.3676	79375	597	336	78	22.96
350	Pinus flexilis	0.4358	0.28	0.4346	67531	624	349	108	27.16
351	Pinus albicaulis	0.4165	0.27	0.4154	38147	581	331	107	25.96
352	Pinus reflexa	0.4877	0.26	0.4864	91287	770	489	128	30 39
353	Pinus Parryana	0.5675	0.54	0.5644	37783	426	339	195	35.37
354	Pinus cembroides	0.6512	0.90	0.6453	. . .	..	..	..	40.58
355	Pinus edulis	0.6388	0.62	0.6348	42094	447	349	212	39.81
356	Pinus monophylla	0.5658	0.68	0.5620	43488	288	274	169	35.26
357	Pinus Balfouriana	0.5434	0.40	0.5412	59386	424	337	147	33.86
357[1]	Pinus Balfouriana, var. aristata	0.5572	0.30	0.5555	71482	653	325	134	34.72
358	Pinus resinosa	0.4854	0.27	0.4841	113216	800	455	85	30.25
359	Pinus Torreyana	0.4879	0.35	0.4862	54213	756	290	147	30.41
360	Pinus Arizonica	0.5038	0.20	0.5028	82370	653	381	105	31.40
361	Pinus ponderosa	0.4715	0.35	0.4698	88781	720	381	107	29.38
362	Pinus Jeffreyi	0.5206	0.26	0.5192	92777	744	417	116	32.44
363	Pinus Chihuahuana	0.5457	0.39	0.5436	72575	832	337	154	34.01
364	Pinus contorta	0.5815	0.19	0.5804	158533	993	554	149	36.24
365	Pinus Murrayana	0.4096	0.32	0.4083	77113	564	333	86	25.53
366	Pinus Sabiniana	0.4840	0.40	0.4821	58517	779	337	138	30.16
367	Pinus Coulteri	0.4133	0.37	0.4118	114108	761	367	92	25.76
368	Pinus insignis	0.4574	0.30	0.4560	97850	740	417	105	28.51
369	Pinus tuberculata	0.3499	0.33	0.3487	42870	409	263	86	21.81
370	Pinus Tæda	0.5441	0.26	0.5427	112847	883	427	107	33.91
371	Pinus rigida	0.5151	0.23	0.5139	58127	739	355	133	32.10
372	Pinus serotina	0.7942	0.17	0.7928	119957	1164	505	296	49.49
373	Pinus inops	0.5309	0.30	0.5293	54295	658	360	156	33.09
374	Pinus clausa	0.5576	0.31	0.5559	54295	502	377	131	34 75
375	Pinus pungens	0.4935	0.27	0.4922	80330	726	354	115	30.75
376	Pinus muricata	0.4942	0.26	0.4929	119357	1031	509	122	30.80
377	Pinus mitis	0 6104	0.29	0.6086	137495	1038	477	129	38.04
378	Pinus glabra	0.3931	0.45	0.3913	44750	496	288	106	24.50
379	Pinus Banksiana	0.4761	0.23	0.4750	94231	652	396	101	29.67
380	Pinus palustris	0.6999	0.25	0.6982	148733	1152	629	153	43.62
381	Pinus Cubensis	0.7504	0.26	0.7484	157747	1172	664	186	46.76
382	Picea nigra	0.4584	0.27	0.4572	109987	747	407	77	28.57
383	Picea alba	0.4051	0.32	0.4038	102280	747	342	74	25.25
384	Picea Engelmanni	0.3449	0.32	0.3438	80791	574	267	76	21.49
385	Picea pungens	0 3740	0.38	0.3726	55360	454	258	79	23.31
386	Picea Sitchensis	0.4287	0.17	0.4280	99001	649	353	73	26.72
387	Tsuga Canadensis	0.4230	0.46	0.4220	89970	736	384	82	26.42
388	Tsuga Caroliniana	0.4275	0 40	0.4258	71282	461	403	125	26.64
389	Tsuga Mertensiana	0.5182	0.42	0.5160	137483	909	547	101	32.29
390	Tsuga Pattoniana	0.4454	0.44	0.4434	77524	719	379	104	27.76
391	Pseudotsuga Douglasii	0.5157	0.08	0.5153	128297	881	519	100	32.14
391[1]	Pseudotsuga Douglasii, var. macrocarpa	0.4563	0.08	0.4559	105007	846	463	102	28.44
392	Abies Fraseri	0.3565	0.54	0.3546	97170	639	347	65	22.22

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture.	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
393	Abies balsamea	0.3819	0.45	0.3802	81924	515	365	75	23.80
394	Abies subalpina	0.3476	0.44	0.3461	76199	473	302	64	21.66
395	Abies grandis	0.3545	0.49	0.3528	95838	494	391	51	22.09
396	Abies concolor	0.3038	0.85	0.3007	90889	703	390	78	22.67
397	Abies bracteata	0.6783	2.04	0.6645	...	..	..	..	42.27
398	Abies amabilis	0.4228	0.23	0.4218	126013	792	467	64	26.35
399	Abies nobilis	0.4561	0.34	0.4545	127660	862	453	120	28.42
400	Abies magnifica	0.4701	0.30	0.4687	66220	701	435	96	29.30
401	Larix Americana	0.6236	0.33	0.6215	126126	901	536	112	38.86
402	Larix occidentalis	0.7407	0.09	0.7400	165810	1227	689	139	46.16
403	Larix Lyallii	...	..	...	...	..	..	..	...
404	Sabal Palmetto	0.4404	7.66	0.4067	...	..	..	..	27.45
405	Washingtonia filifera	0.5173	1.89	0.5075	56346	429	227	66	32.24
406	Thrinax parviflora	0.5991	3.99	0.5752	...	..	..	..	37.34
407	Thrinax argentea	0.7172	3.01	0.6956	...	..	..	..	44.70
408	Oreodoxa regia	0.6034	2.21	0.5901	...	..	..	..	37.60
409	Yucca canaliculata	0.6677	6.27	0.6258	...	..	..	..	41.61
410	Yucca brevifolia	0.3737	4.00	0.3588	...	..	..	..	23.29
411	Yucca elata	0.4470	9.28	0.4055	...	..	..	..	27.86
412	Yucca baccata	0.2724	8.94	0.2480	...	..	..	..	16.98

TABLE II.

The Trees of the United States arranged in the Order of the Specific Gravity of their Dry Woods.

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
1	Condalia ferrea	1.3020	41	Eugenia monticola	0.9156
2	Condalia obovata	1.1999	42	Avicennia nitida	0.9138
3	Rhizophora Mangle	1.1617	43	Hypelate trifoliata	0.9102
4	Guaiacum sanctum	1.1432	44	Quercus rubra, var. Texana	0.9080
5	Vauquelinia Torreyi	1.1374	45	Pithecolobium Unguis-cati	0.9049
6	Eugenia longipes	1.1235	46	Myginda pallens	0.9048
7	Porliera angustifolia	1.1101	47	Xanthoxylum Caribæum	0.9002
8	Sebastiania lucida	1.0905	48	Prunus sphærocarpa	0.8998
9	Mimusops Sieberi	1.0838	49	Calyptranthes Chytraculia	0.8992
10	Cercocarpus ledifolius	1.0731	50	Eugenia dichotoma	0.8983
11	Reynosia latifolia	1.0715	51	Quercus Douglasii	0.8928
12	Olneya Tesota	1.0002	52	Eysenhardtia orthocarpa	0.8740
13	Amyris sylvatica	1.0459	53	Piscidia Erythrina	0.8734
14	Genipa clusiæfolia	1.0316	54	Citharexylum villosum	0.8710
15	Sideroxylon Mastichodendron	1.0109	55	Prunus Caroliniana	0.8688
16	Quercus grisea	1.0092	56	Cratægus coccinea	0.8618
17	Conocarpus erecta	0.9900	57	Quercus prinoides	0.8605
18	Canella alba	0.9893	58	Ardisia Pickeringia	0.8602
19	Sophora secundiflora	0.9842	59	Acacia Greggii	0.8550
20	Coccoloba Floridana	0.9835	60	Sophora affinis	0.8509
21	Prunus ilicifolia	0.9803	61	Quercus chrysolepis	0.8493
22	Coccoloba uvifera	0.9635	62	Diospyros Texana	0.8460
23	Hypelate paniculata	0.9533	63	Quercus undulata, var. Gambelii	0.8407
24	Quercus Durandii	0.9507	64	Carya alba	0.8372
25	Quercus virens	0.9501	65	Sapindus Saponaria	0.8367
26	Quercus reticulata	0.9479	66	Quercus obtusiloba	0.8367
27	Eugenia procera	0.9453	67	Myrsine Rapanea	0.8341
28	Quercus oblongifolia	0.9441	68	Guettarda elliptica	0.8337
29	Acacia Wrightii	0.9392	69	Viburnum prunifolium	0.8332
30	Cercocarpus parvifolius	0.9365	70	Ptelia trifoliata	0.8319
31	Eugenia buxifolia	0.9360	71	Pyrus rivularis	0.8316
32	Chrysophyllum oliviforme	0.9360	72	Quercus lyrata	0.8313
33	Drypetes crocea, var. latifolia	0.9346	73	Ostrya Virginica	0.8284
34	Heteromeles arbutifolia	0.9326	74	Quercus agrifolia	0.8253
35	Diphollis salicifolia	0.9316	75	Carya tomentosa	0.8218
36	Exostema Caribæum	0.9310	76	Carya porcina	0.8217
37	Quercus Emoryi	0.9263	77	Colubrina reclinata	0.8208
38	Leucæna glauca	0.9235	78	Prunus umbellata	0.8202
39	Drypetes crocea	0.9209	79	Cornus florida	0.8153
40	Ximenia Americana	0.9196	80	Sapindus marginatus	0.8126

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
81	Osmanthus Americanus	0.8111	136	Quercus coccinea	0.7405
82	Carya sulcata	0.8108	137	Gleditschia monosperma	0.7342
83	Robinia viscosa	0.8094	138	Robinia Pseudacacia	0 7333
84	Bourreria Havanensis	0.8073	139	Quercus nigra	0.7324
85	Quercus Michauxii	0.8039	140	Viburnum Lentago	0.7303
86	Robinia Neo-Mexicana	0.8034	141	Quercus Catesbæi	0.7294
87	Carya myristicæformis	0 8016	142	Bumelia tenax	0.7293
88	Quercus hypoleuca	0.8009	143	Cratægus cordata	0.7293
89	Bumelia cuneata	0.7959	144	Celtis occidentalis	0.7287
90	Cratægus subvillosa	0.7953	145	Carpinus Caroliniana	0.7286
91	Pinus serotina	0.7942	146	Swietenia Mahogoni	0.7282
92	Rhus Metopium	0.7917	147	Celtis occidentalis, var. reticulata	0 7275
93	Diospyros Virginiana	0.7908	148	Ilex Cassine	0.7270
94	Fraxinus Greggii	0.7904	149	Ulmus racemosa	0.7263
95	Prunus Capuli	0.7879	150	Ulmus crassifolia	0.7245
96	Quercus Wislizeni	0.7855	151	Quercus aquatica	0.7244
97	Amelanchier Canadensis	0.7838	152	Prunus Americana	0 7215
98	Cratægus flava	0.7809	153	Cratægus Crus-galli	0.7194
99	Schæfferia frutescens	0.7745	154	Fraxinus quadrangulata	0.7184
100	Maclura aurantiaca	0.7736	155	Carya olivæformis	0.7180
101	Morus microphylla	0.7715	156	Thrinax argentea	0.7172
102	Chrysobalanus Icaco	0.7709	157	Kalmia latifolia	0.7160
103	Cratægus rivularis	0.7703	158	Cratægus spathulata	0.7159
104	Nectandra Willdenoviana	0.7693	159	Fremontia Californica	0.7142
105	Cratægus flava var. pubescens	0.7683	160	Laguncularia racemosa	0.7137
106	Quercus laurifolia	0.7673	161	Juniperus occidentalis, var. monosperma	0.7118
107	Quercus bicolor	0.7662			
108	Prosopis juliflora	0.7652	162	Fraxinus viridis	0 7117
109	Fraxinus Americana, var. Texensis	0.7636	163	Cordia Sebestena	0.7108
110	Betula lenta	0.7617	164	Arbutus Xalapensis	0.7099
111	Vaccinium arboreum	0.7610	165	Arbutus Menziesii	0.7052
112	Prosopis pubescens	0.7609	166	Pyrus coronaria	0.7048
113	Cratægus tomentosa	0.7585	167	Quercus tinctoria	0.7045
114	Carya amara	0.7552	168	Pinus palustris	0.6999
115	Quercus imbricaria	0.7529	169	Capparis Jamaicensis	0 6971
116	Cercis reniformis	0.7513	170	Ulmus fulva	0.6956
117	Pinus Cubensis	0.7504	171	Prunus demissa	0 6951
118	Arbutus Texana	0.7500	172	Cratægus Douglasii	0.6950
119	Andromeda ferruginea	0.7500	173	Jacquinia armillaris	0.6948
120	Quercus Prinus	0.7499	174	Quercus palustris	0.6938
121	Ulmus alata	0.7491	175	Gymnocladus Canadensis	0 6934
122	Cornus Nuttallii	0.7481	176	Quercus falcata	0.6928
123	Quercus Phellos	0.7472	177	Acer saccharinum, var. nigrum	0.6915
124	Quercus alba	0.7470	178	Acer saccharinum	0.6912
125	Bumelia lycioides	0.7467	179	Juniperus occidentalis, var. conjugens	0.6907
126	Oxydendrum arboreum	0.7458			
127	Cratægus apiifolia	0.7453	180	Acer grandidentatum	0.6902
128	Quercus macrocarpa	0.7453	181	Pyrus angustifolia	0.6895
129	Quercus Garryana	0.7449	182	Canotia holacantha	0.6885
130	Parkinsonia microphylla	0.7449	183	Prunus angustifolia	0.6884
131	Xanthoxylum Pterota	0.7444	184	Fagus ferruginea	0.6883
132	Ilex decidua	0 7420	185	Hamamelis Virginica	0.6856
133	Quercus lobata	0.7409	186	Quercus heterophylla	0 6834
134	Carya aquatica	0.7407	187	Quercus densiflora	0.6827
135	Larix occidentalis	0 7407	188	Fraxinus pistaciæfolia	0 6810

Relative Order.	Species.	Specific Gravity.
189	Cratægus brachyacantha	0.6793
190	Cordia Boissieri	0.6790
191	Cyrilla racemiflora	0.6784
192	Abies bracteata	0.6783
193	Gleditschia triacanthos	0.6740
194	Leucæna pulverulenta	0.6732
195	Myrica Californica	0.6703
196	Cornus alternifolia	0.6696
197	Yucca canaliculata	0.6677
198	Acer circinatum	0.6660
199	Bumelia spinosa	0.6603
200	Fraxinus anomala	0.6597
201	Euonymus atropurpureus	0.6592
202	Cratægus æstivalis	0.6564
203	Juglans rupestris	0.6554
204	Betula lutea	0.6553
205	Bumelia lanuginosa	0.6544
206	Fraxinus Americana	0.6543
207	Quercus rubra	0.6540
208	Parkinsonia Torreyana	0.6531
209	Pisonia obtusata	0.6529
210	Umbellularia Californica	0.6517
211	Pinus cembroides	0.6512
212	Ulmus Americana	0.6506
213	Cratægus arborescens	0.6491
214	Ehretia elliptica	0.6440
215	Quercus Kelloggii	0.6435
216	Persea Carolinensis	0.6429
217	Rhus cotinoides	0.6425
218	Quercus cinerea	0.6420
219	Lysiloma latisiliqua	0.6418
220	Ficus brevifolia	0.6398
221	Persea Carolinensis, var palustris	0.6396
222	Taxus brevifolia	0.6391
223	Pinus edulis	0.6388
224	Chionanthus Virginica	0.6372
225	Cercis Canadensis	0.6363
226	Magnolia grandiflora	0.6360
227	Nyssa sylvatica	0.6356
228	Forestiera acuminata	0.6345
229	Taxus Floridana	0.6340
230	Ungnadia speciosa	0.6332
231	Crescentia cucurbitina	0.6319
232	Fraxinus sambucifolia	0.6318
233	Rhododendron maximum	0.6303
234	Juniperus Californica	0.6282
235	Cladrastis tinctoria	0.6278
236	Cupressus macrocarpa	0.6261
237	Fraxinus pubescens	0.6251
238	Cliftonia ligustrina	0.6249
239	Larix Americana	0.6236
240	Acer rubrum	0.6178
241	Parkinsonia aculeata	0.6116
242	Juglans nigra	0.6115
243	Pinus mitis	0.6104
244	Salix cordata, var. vestita	0.6069
245	Oreodoxa regia	0.6034
246	Betula occidentalis	0.6030
247	Acer glabrum	0.6028
248	Rhamnus Californica	0.6000
249	Thrinax parviflora	0.5990
250	Xanthoxylum Clava-Herculis, var. fruticosum	0.5967
251	Betula papyrifera	0.5955
252	Pyrus sambucifolia	0.5928
253	Liquidambar Styraciflua	0.5909
254	Chilopsis saligna	0.5902
255	Morus rubra	0.5898
256	Byrsonima lucida	0.5888
257	Castanea pumila	0.5887
258	Ilex Dahoon, var. myrtifolia	0.5873
259	Juniperus pachyphlœa	0.5829
260	Prunus serotina	0.5822
261	Ilex opaca	0.5818
262	Pinus contorta	0.5815
263	Fraxinus viridis, var. Berlandieriana	0.5780
264	Hippomane Mancinella	0.5772
265	Juniperus occidentalis	0.5765
266	Betula nigra	0.5762
267	Betula alba, var. populifolia	0.5760
268	Ceanothus thyrsiflorus	0.5750
269	Fraxinus Oregana	0.5731
270	Halesia diptera	0.5705
271	Platanus occidentalis	0.5678
272	Pinus Parryana	0.5675
273	Rhamnus Purshiana	0.5672
274	Pinus monophylla	0.5658
275	Xanthoxylum Americanum	0.5654
276	Myrica cerifera	0.5637
277	Halesia tetraptera	0.5628
278	Salix lasiolepis	0.5587
279	Pinus clausa	0.5576
280	Castanopsis chrysophylla	0.5574
281	Pinus Balfouriana, var. aristata	0.5572
282	Dalea spinosa	0.5536
283	Juniperus Californica, var. Utahensis	0.5522
284	Rhamnus Caroliniana	0.5462
285	Acer rubrum, var. Drummondii	0.5459
286	Pinus Chihuahuana	0.5457
287	Pyrus Americana	0.5451
288	Pinus Tæda	0.5441
289	Pinus Balfouriana	0.5434
290	Salix flavescens, var. Scouleriana	0.5412
291	Pinckneya pubens	0.5350
292	Salix Hookeriana	0.5350
293	Salix longifolia, var. exigua	0.5342
294	Acer spicatum	0.5330
295	Symplocos tinctoria	0.5325

Relative Order.	Species.	Specific Gravity.
296	Magnolia macrophylla	0.5309
297	Pinus inops	0.5309
298	Acer Pennsylvanicum	0.5299
299	Planera aquatica	0.5294
300	Rhus copallina	0.5273
301	Acer dasycarpum	0.5269
302	Pinus Jeffreyi	0.5206
303	Nyssa uniflora	0.5194
304	Rhus copallina, var. lanceolata	0.5184
305	Tsuga Mertensiana	0.5182
306	Washingtonia filifera	0.5173
307	Pseudotsuga Douglasii	0.5157
308	Pinus rigida	0.5151
309	Torreya taxifolia	0.5145
310	Sambucus glauca	0.5087
311	Salix Sitchensis	0.5072
312	Xanthoxylum Clava-Herculis	0.5056
313	Anona laurifolia	0.5053
314	Sassafras officinale	0.5042
315	Pinus Arizonica	0.5038
316	Magnolia glauca	0.5035
317	Prunus Pennsylvanica	0.5023
318	Magnolia Fraseri	0.5003
319	Alnus maritima	0.4996
320	Æsculus Californica	0.4980
321	Salix flavescens	0.4969
322	Pinus muricata	0.4942
323	Pinus pungens	0.4935
324	Salix longifolia	0.4930
325	Juniperus Virginiana	0.4926
326	Populus Fremontii	0.4914
327	Acer macrophyllum	0.4909
328	Platanus racemosa	0.4880
329	Pinus Torreyana	0.4879
330	Pinus reflexa	0.4877
331	Salix lævigata	0.4872
332	Pinus resinosa	0.4854
333	Cupressus Guadalupensis	0.4843
334	Pinus Sabiniana	0.4840
335	Negundo Californicum	0.4821
336	Alnus rubra	0.4813
337	Ilex Dahoon	0.4806
338	Chamæcyparis Nutkaensis	0.4782
339	Pinus Banksiana	0.4761
340	Torreya Californica	0.4760
341	Salix lasiandra	0.4756
342	Ficus pedunculata	0.4739
343	Platanus Wrightii	0.4736
344	Gordonia Lasianthus	0.4728
345	Pinus ponderosa	0.4715
346	Abies magnifica	0.4701
347	Magnolia acuminata	0.4690
348	Cupressus Goveniana	0.4689
349	Alnus serrulata	0.4666
350	Populus grandidentata	0.4632
351	Populus Fremontii, var. Wislizenii	0.4621
352	Chamæcyparis Lawsoniana	0.4621
353	Sambucus Mexicana	0.4614
354	Nyssa capitata	0.4613
355	Alnus incana	0.4607
356	Salix lasiandra, var. Fendleriana	0.4598
357	Picea nigra	0.4584
358	Pinus insignis	0.4574
359	Pseudotsuga Douglasii, var. macrocarpa	0.4563
360	Abies nobilis	0.4561
361	Salix lasiandra, var. lancifolia	0.4547
362	Taxodium distichum	0.4543
363	Æsculus glabra	0.4542
364	Tilia Americana	0.4525
365	Salix amygdaloides	0.4509
366	Castanea vulgaris, var. Americana	0.4504
367	Prunus emarginata, var. mollis	0.4502
368	Magnolia Umbrella	0.4487
369	Catalpa bignonioides	0.4474
370	Yucca elata	0.4470
371	Salix nigra	0.4456
372	Tsuga Pattonianna	0.4454
373	Sabal Palmetto	0.4404
374	Salix sessilifolia	0.4397
375	Rhus venenata	0.4382
376	Pinus flexilis	0.4358
377	Rhus typhina	0.4357
378	Negundo aceroides	0.4328
379	Picea Sitchensis	0.4287
380	Tsuga Caroliniana	0.4275
381	Æsculus flava	0.4274
382	Salix discolor	0.4261
383	Tilia heterophylla	0.4253
384	Tsuga Canadensis	0.4239
385	Liriodendron Tulipifera	0.4230
386	Abies amabilis	0.4228
387	Sequoia sempervirens	0.4208
388	Catalpa speciosa	0.4165
389	Pinus albicaulis	0.4165
390	Populus balsamifera, var. candicans	0.4161
391	Magnolia cordata	0.4139
392	Simaruba glauca	0.4136
393	Pinus Coulteri	0.4133
394	Alnus rhombifolia	0.4127
395	Pinus Murrayana	0.4096
396	Populus heterophylla	0.4089
397	Juglans cinerea	0.4086
398	Tilia Americana, var. pubescens	0.4074
399	Picea alba	0.4051
400	Populus tremuloides	0.4032
401	Libocedrus decurrens	0.4017
402	Alnus oblongifolia	0.3981
403	Asimina triloba	0.3969
404	Pinus glabra	0.3931

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
405	Populus angustifolia	0.3912	418	Abies grandis	0.3545
406	Pinus monticola	0.3908	419	Fraxinus platycarpa	0.3541
407	Populus monilifera	0.3889	420	Pinus tuberculata	0.3499
408	Pinus Strobus	0.3854	421	Abies subalpina	0.3476
409	Abies balsamea	0.3819	422	Picea Engelmanni	0.3449
410	Populus trichocarpa	0.3814	423	Chamæcyparis sphæroidea	0.3322
411	Thuya gigantea	0.3796	424	Cereus giganteus	0.3188
412	Picea pungens	0.3740	425	Thuya occidentalis	0.3164
413	Yucca brevifolia	0.3737	426	Bursera gummifera	0.3003
414	Pinus Lambertiana	0.3684	427	Sequoia gigantea	0.2882
415	Abies concolor	0.3638	428	Yucca baccata	0.2724
416	Populus balsamifera	0.3635	429	Ficus aurea	0.2616
417	Abies Fraseri	0.3565			

TABLE III.

The Principal Trees of the United States arranged in the Order of the Relative Approximate Fuel Value of their Dry Woods.

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
1	Condalia ferrea	1.1938	41	Leucæna glauca	0.8931
2	Rhizophora Mangle	1.1406	42	Prunus sphærocarpa	0.8920
3	Guaiacum sanctum	1.1338	43	Eugenia dichotoma	0.8917
4	Vauquelinia Torreyi	1.1209	44	Avicennia nitida	0.8909
5	Condalia obovata	1.1155	45	Quercus Douglasii	0.8853
6	Porliera angustifolia	1.1044	46	Pithecolobium Unguis cati	0.8826
7	Eugenia longipes	1.0844	47	Xanthoxylum Caribæum	0.8820
8	Cercocarpus ledifolius	1.0619	48	Myginda pallens	0.8739
9	Sebastiania lucida	1.0602	49	Calyptranthes Chytraculia	0.8693
10	Mimusops Sieberi	1.0555	50	Citharexylum villosum	0.8665
11	Amyris sylvatica	1.0397	51	Prunus Caroliniana	0.8652
12	Reynosia latifolia	1.0372	52	Drypetes crocea	0.8644
13	Olneya Tesota	1.0359	53	Eysenhardtia orthocarpa	0.8628
14	Genipa clusiæfolia	1.0207	54	Cratægus coccinea	0.8585
15	Quercus grisea	0.9908	55	Drypetes crocea, var. latifolia	0.8571
16	Conocarpus erecta	0.9868	56	Quercus prinoides	0.8507
17	Prunus ilicifolia	0.9727	57	Acacia Greggii	0.8472
18	Canella alba	0.9720	58	Sophora affinis	0.8443
19	Sophora secundiflora	0.9686	59	Quercus chrysolepis	0.8442
20	Sideroxylon Mastichodendron	0.9589	60	Ardisia Pickeringia	0.8444
21	Coccoloba uvifera	0.9503	61	Piscidia Erythrina	0.8439
22	Quercus reticulata	0.9430	62	Quercus undulata, var. Gambellii	0.8324
23	Hypelate paniculata	0.9414	63	Carya alba	0.8311
24	Quercus virens	0.9393	64	Quercus obtusiloba	0.8301
25	Coccoloba Floridana	0.9340	65	Ptelea trifoliata	0.8294
26	Quercus Durandii	0.9338	66	Viburnum prunifolium	0.8289
27	Acacia Wrightii	0.9333	67	Pyrus rivularis	0.8282
28	Cercocarpus parvifolius	0.9323	68	Myrsine Rapanea	0.8271
29	Exostema Caribæum	0.9289	69	Quercus lyrata	0.8269
30	Dipholis salicifolia	0.9286	70	Guettarda elliptica	0.8250
31	Heteromeles arbutifolia	0.9276	71	Ostrya Virginica	0.8243
32	Chrysophyllum oliviforme	0.9244	72	Prunus umbellata	0.8192
33	Eugenia buxifolia	0.9220	73	Diospyros Texana	0.8178
34	Eugenia procera	0.9205	74	Quercus agrifolia	0.8147
35	Quercus oblongifolia	0.9195	75	Carya porcina	0.8136
36	Ximenia Americana	0.9129	76	Carya tomentosa	0.8131
37	Quercus Emoryi	0.9044	77	Cornus florida	0.8098
38	Quercus rubra, var. Texana	0.9003	78	Robinia viscosa	0.8078
39	Eugenia monticola	0.8983	79	Osmanthus Americanus	0.8074
40	Hypelate trifoliata	0.8976	80	Colubrina reclinata	0.8064

Relative Order.	Species.	Relative Approximate Fuel Value.
81	Carya sulcata	0.8035
82	Sapindus marginatus	0 8004
83	Sapindus Saponaria	0 8004
84	Quercus Michauxii	0.8003
85	Robinia Neo-Mexicana	0.7986
86	Carya myristicæformis	0 7931
87	Pinus serotina	0.7928
88	Quercus hypoleuca	0.7902
89	Cratægus subvillosa	0.7898
90	Prunus Capuli	0.7863
91	Bourreria Havanensis	0.7848
92	Diospyros Virginiana	0.7832
93	Fraxinus Greggii	0 7830
94	Bumelia cuneata	0.7808
95	Amelanchier Canadensis	0.7795
96	Quercus Wislizeni	0.7775
97	Cratægus flava	0.7748
98	Rhus Metopium	0.7728
99	Maclura aurantiaca	0.7683
100	Cratægus rivularis	0.7676
101	Morus microphylla	0.7663
102	Nectandra Wildenoviana	0 7647
103	Cratægus tomentosa, var. punctata	0.7645
104	Chrysobalanus Icaco	0.7642
105	Quercus bicolor	0 7618
106	Cratægus flava, var. pubescens	0.7613
107	Quercus laurifolia	0.7610
108	Betula lenta	0.7597
109	Fraxinus Americana, var. Texensis	0.7583
110	Vaccinium arboreum	0.7580
111	Schæfferia frutescens	0.7548
112	Cratægus tomentosa	0.7546
113	Prosopis pubescens	0.7537
114	Quercus imbricaria	0.7497
115	Prosopis juliflora	0.7485
116	Pinus Cubensis	0.7484
117	Carya amara	0.7474
118	Andromeda ferruginea	0.7465
119	Arbutus Texana	0.7462
120	Cercis reniformis	0.7455
121	Cornus Nuttallii	0 7444
122	Quercus Prinus	0.7441
123	Quercus alba	0 7439
124	Quercus Phellos	0.7435
125	Oxydendrum arboreum	0.7430
126	Quercus Garryana	0.7424
127	Ulmus alata	0 7417
128	Bumelia lycioides	0.7407
129	Quercus macrocarpa	0.7400
130	Larix occidentalis	0.7400
131	Quercus coccinea	0.7391
132	Quercus lobata	0.7387
133	Xanthoxylum Pterota	0.7386
134	Cratægus apiifolia	0.7381
135	Ilex decidua	0.7368
136	Carya aquatica	0.7313
137	Robinia Pseudacacia	0.7296
138	Gleditschia monosperma	0.7288
139	Viburnum Lentago	0.7282
140	Cratægus cordata	0.7259
141	Quercus nigra	0.7239
142	Bumelia tenax	0.7236
143	Quercus Catesbæi	0.7231
144	Carpinus Caroliniana	0.7220
145	Ulmus racemosa	0.7219
146	Celtis occidentalis	0.7208
147	Ilex Cassine	0.7207
148	Quercus aquatica	0 7207
149	Swietenia Mahogoni	0.7203
150	Prunus Americana	0.7202
151	Celtis occidentalis, var reticulata	0.7186
152	Parkinsonia microphylla	0.7178
153	Ulmus crassifolia	0.7158
154	Cratægus Crus-galli	0.7154
155	Kalmia latifolia	0.7131
156	Fraxinus quadrangulata	0.7128
157	Cratægus spathulata	0.7112
158	Carya oliviæformis	0.7099
159	Arbutus Xalapensis	0.7081
160	Fraxinus viridis	0.7071
161	Juniperus occidentalis, var. monosperma	0.7062
162	Quercus tinctoria	0.7025
163	Arbutus Menziesii	0.7024
164	Fremontia Californica	0.7021
165	Laguncularia racemosa	0.7021
166	Pyrus coronaria	0.7011
167	Pinus palustris	0 6982
168	Thrinax argentea	0.6956
169	Cratægus Douglasii	0.6927
170	Prunus demissa	0.6916
171	Quercus falcata	0.6911
172	Ulmus fulva	0.6898
173	Gymnocladus Canadensis	0.6888
174	Quercus palustris	0.6882
175	Acer saccharinum	0.6875
176	Juniperus occidentalis, var. conjugens	0.6875
177	Pyrus angustifolia	0.6872
178	Acer saccharinum, var. nigrum	0.6806
179	Prunus angustifolia	0.6805
180	Acer grandidentatum	0.6858
181	Fagus ferruginea	0.6848
182	Hamamelis Virginica	0.6831
183	Quercus heterophylla	0.6822
184	Cordia Sebestena	0.6808
185	Fraxinus pistaciæfolia	0.6768
186	Cratægus brachyacantha	0.6764
187	Cyrilla racemiflora	0.6756
188	Quercus densiflora	0.6725

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
189	Jacquinia armillaris	0·6708	244	Pisonia obtusata	0·6031
190	Gleditschia triacanthos	0·6686	245	Betula occidentalis	0·6012
191	Myrica Californica	0·6681	246	Acer glabrum	0·6010
192	Cornus alternifolia	0·6669	247	Parkinsonia aculeata	0·5974
193	Leucæna pulverulenta	0·6664	248	Rhamnus California	0·5965
194	Abies bracteata	0·6645	249	Betula papyrifera	0·5940
195	Capparis Jamaicensis	0·6639	250	Xanthoxylum Clava-Herculis, var. fruticosum	0·5922
196	Acer circinatum	0·6634			
197	Euonymus atropurpureus	0·6554	251	Pyrus sambucifolia	0·5908
198	Cordia Boissieri	0·6550	252	Oreodoxa regia	0·5901
199	Fraxinus anomala	0·6541	253	Castanea pumila	0·5880
200	Betula lutea	0·6533	254	Chilopsis saligna	0·5880
201	Crataegus æstivalis	0·6527	255	Liquidambar Styraciflua	0·5873
202	Quercus rubra	0·6523	256	Morus rubra	0·5856
203	Bumelia spinosa	0·6521	257	Juniperus pachyphlœa	0·5823
204	Canotia holacantha	0·6518	258	Ilex Dahoon, var. myrtifolia	0·5820
205	Fraxinus Americana	0·6516	259	Prunus serotina	0·5813
206	Umbellularia Californica	0·6492	260	Pinus contorta	0·5804
207	Juglans rupestris	0·6488	261	Ilex opaca	0·5774
208	Bumelia lanuginosa	0·6464	262	Juniperus occidentalis	0·5758
209	Parkinsonia Torreyana	0·6458	263	Thrinax parviflora	0·5752
210	Crataegus arborescens	0·6455	264	Fraxinus viridis, var. Berlandiciana	0·5749
211	Ulmus Americana	0·6454			
212	Pinus cembroides	0·6453	265	Betula alba, var. populifolia	0·5743
213	Quercus Kelloggii	0·6418	266	Byrsonima lucida	0·5743
214	Rhus cotinoides	0·6393	267	Betula nigra	0·5742
215	Persea Carolinensis	0·6380	268	Fraxinus Oregana	0·5712
216	Taxus brevifolia	0·6377	269	Ceanothus thyrsiflorus	0·5710
217	Persea Carolinensis, var. palustris	0·6372	270	Halesia diptera	0·5681
218	Ehretia elliptica	0·6355	271	Platanus occidentalis	0·5652
219	Pinus edulis	0·6348	272	Pinus Parryana	0·5644
220	Quercus cinerea	0·6342	273	Rhamnus Purshiana	0·5634
221	Chionanthus Virginica	0·6340	274	Xanthoxylum Americanum	0·5622
222	Taxus Floridana	0·6327	275	Pinus monophylla	0·5620
223	Magnolia grandiflora	0·6326	276	Myrica cerifera	0·5608
224	Nyssa sylvatica	0·6323	277	Halesia tetraptera	0·5605
225	Cercis Canadensis	0·6317	278	Pinus clausa	0·5559
226	Forestiera acuminata	0·6299	279	Pinus Balfouriana, var. aristata	0·5555
227	Lysiloma latisiliqua	0·6282	280	Castanopsis chrysophylla	0·5554
228	Rhododendron maximum	0·6280	281	Salix lasiolepis	0·5532
229	Fraxinus sambucifolia	0·6273	282	Juniperus Californica, var. Utahensis	0·5495
230	Cladrastis tinctoria	0·6260			
231	Ungnadia speciosa	0·6258	283	Hippomane Mancinella	0·5474
232	Yucca canaliculata	0·6258	284	Acer rubrum, var. Drummondii	0·5440
233	Fraxinus pubescens	0·6235	285	Pinus Chihuahuana	0·5436
234	Juniperus Californica	0·6235	286	Pinus Taeda	0·5427
235	Crescentia cucurbitina	0·6234	287	Rhamnus Caroliniana	0·5427
236	Cupressus macrocarpa	0·6225	288	Pinus Balfouriana	0·5412
237	Cliftonia ligustrina	0·6223	289	Pyrus Americana	0·5406
238	Larix Americana	0·6215	290	Salix flavescens, var. Scouleriana	0·5391
239	Acer rubrum	0·6155	291	Salix Hookeriana	0·5383
240	Ficus brevifolia	0·6119	292	Pinckneya pubens	0·5328
241	Pinus mitis	0·6086	293	Dalea spinosa	0·5312
242	Juglans nigra	0·6067	294	Acer spicatum	0·5307
243	Salix cordata, var. vestita	0·6033	295	Pinus inops	0·5293

Relative Order.	Species.	Relative Approximate Fuel Value.
296	Magnolia macrophylla	0.5290
297	Symplocos tinctoria	0.5289
298	Salix longifolia, var. exigua	0.5285
299	Acer Pennsylvanicum	0.5280
300	Planera aquatica	0.5270
301	Acer dasycarpum	0.5252
302	Rhus copallina	0.5241
303	Pinus Jeffreyi	0.5192
304	Tsuga Mertensiana	0.5100
305	Nyssa uniflora	0.5158
306	Pseudotsuga Douglasii	0.5153
307	Rhus copallina, var. lanceolata	0.5140
308	Pinus rigida	0.5139
309	Torreya taxifolia	0.5107
310	Washingtonia filifera	0.5075
311	Salix Sitchensis	0.5042
312	Sassafras officinale	0.5037
313	Pinus Arizonica	0.5028
314	Xanthoxylum Clava-Herculis	0.5015
315	Magnolia glauca	0.5011
316	Sambucus glauca	0.5007
317	Prunus Pennsylvanica	0.5003
318	Magnolia Fraseri	0.4989
319	Alnus maritima	0.4977
320	Æsculus Californica	0.4945
321	Salix flavescens	0.4939
322	Pinus muricata	0.4929
323	Pinus pungens	0.4922
324	Juniperus Virginiana	0.4920
325	Salix longifolia	0.4906
326	Acer macrophyllum	0.4882
327	Populus Fremontii	0.4876
328	Pinus reflexa	0.4864
329	Pinus Torreyana	0.4862
330	Salix lævigata	0.4844
331	Pinus resinosa	0.4841
332	Platanus racemosa	0.4826
333	Cupressus Guadalupensis	0.4822
334	Pinus Sabiniana	0.4821
335	Anona laurifolia	0.4807
336	Negundo Californicum	0.4795
337	Alnus rubra	0.4793
338	Chamæcyparis Nutkaensis	0.4766
339	Ilex Dahoon	0.4762
340	Pinus Banksiana	0.4750
341	Salix lasiandra	0.4727
342	Pinus ponderosa	0.4698
343	Torreya Californica	0.4696
344	Gordonia Lasianthus	0.4692
345	Abies magnifica	0.4687
346	Magnolia acuminata	0.4676
347	Platanus Wrightii	0.4672
348	Cupressus Goveniana	0.4668
349	Alnus serrulata	0.4648
350	Chamæcyparis Lawsoniana	0.4616
351	Populus grandidentata	0.4611
352	Nyssa capitata	0.4597
353	Alnus incana	0.4588
354	Salix lasiandra, var. Fendleriana	0.4572
355	Picea nigra	0.4572
356	Populus Fremontii, var. Wislizeni	0.4569
357	Pinus insignis	0.4560
358	Pseudotsuga Douglasii, var. macrocarpa	0.4559
359	Abies nobilis	0.4545
360	Taxodium distichum	0.4524
361	Sambucus Mexicana	0.4522
362	Ficus pedunculata	0.4506
363	Æsculus glabra	0.4503
364	Tilia Americana	0.4500
365	Castanea vulgaris, var. Americana	0.4496
366	Prunus emarginata, var. mollis	0.4493
367	Magnolia Umbrella	0.4478
368	Salix amygdaloides	0.4468
369	Catalpa bignonioides	0.4457
370	Tsuga Pattoniana	0.4434
371	Salix nigra	0.4425
372	Salix lasiandra, var. lancifolia	0.4411
373	Salix sessilifolia	0.4375
374	Rhus venenata	0.4354
375	Pinus flexilis	0.4346
376	Rhus typhina	0.4335
377	Negundo aceroides	0.4282
378	Picea Sitchensis	0.4280
379	Tsuga Caroliniana	0.4258
380	Salix discolor	0.4243
381	Æsculus flava	0.4231
382	Tilia heterophylla	0.4227
383	Liriodendron Tulipifera	0.4220
384	Tsuga Canadensis	0.4220
385	Abies amabilis	0.4218
386	Sequoia sempervirens	0.4202
387	Pinus albicaulis	0.4154
388	Catalpa speciosa	0.4149
389	Populus balsamifera, var. candicans	0.4142
390	Magnolia cordata	0.4126
391	Pinus Coulteri	0.4118
392	Alnus rhombifolia	0.4104
393	Simaruba glauca	0.4098
394	Pinus Murrayana	0.4083
395	Sabal Palmetto	0.4067
396	Juglans cinerea	0.4065
397	Populus heterophylla	0.4056
398	Yucca alata	0.4055
399	Tilia Americana, var. pubescens	0.4048
400	Picea alba	0.4038
401	Libocedrus decurrens	0.4014
402	Populus tremuloides	0.4010
403	Alnus oblongifolia	0.3964
404	Asimina triloba	0.3961

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
405	Pinus glabra	0.3913	418	Abies Fraseri	0.3546
406	Pinus monticola	0.3899	419	Abies grandis	0.3528
407	Populus angustifolia	0.3881	420	Fraxinus platycarpa	0.3515
408	Populus monilifera	0.3852	421	Pinus tuberculata	0.3487
409	Pinus Strobus	0.3847	422	Abies subalpina	0.3461
410	Abies balsamea	0.3802	423	Picea Engelmanni	0.3338
411	Thuya gigantea	0.3790	424	Chamæcyparis sphæroidea	0.3311
412	Populus trichocarpa	0.3766	425	Thuya occidentalis	0.3152
413	Picea pungens	0.3726	426	Cereus giganteus	0.3078
414	Pinus Lambertiana	0.3676	427	Bursera gummifera	0.2942
415	Populus balsamifera	0.3611	428	Sequoia gigantea	0.2868
416	Abies concolor	0.3607	429	Ficus aurea	0.2484
417	Yucca brevifolia	0.3588	430	Yucca baccata	0.2480

TABLE IV.

The Principal Trees of the United States arranged in the Order of the Elasticity of their Woods (Coefficient of Elasticity, — Kilogram, Centimetre).

Relative Order.	Species.	Coefficient of Elasticity.	Relative Order.	Species.	Coefficient of Elasticity.
1	Larix occidentalis	165810	47	Castanea pumila	114108
2	Rhizophora Mangle	165567	48	Quercus virens	113627
3	Betula lutea	161723	49	Coccoloba Floridana	113538
4	Pinus contorta	158638	50	Pinus resinosa	113216
5	Pinus Cubensis	157747	51	Pinus Tæda	112847
6	Eugenia buxifolia	157510	52	Quercus rubra	112798
7	Pinus palustris	148733	53	Quercus prinoides	112461
8	Carya myristicæformis	146484	54	Chrysophyllum oliviforme	112424
9	Acer saccharinum	146108	55	Quercus palustris	112296
10	Betula lenta	141308	56	Canella alba	111698
11	Quercus falcata	140151	57	Populus trichocarpa	111694
12	Carya alba	138839	58	Betula nigra	111322
13	Pinus mitis	137495	59	Hypelate paniculata	111144
14	Tsuga Mertensiana	137483	60	Acer dasycarpum	110973
15	Ostrya Virginica	137276	61	Chrysobalanus Icaco	110973
16	Diphiolis salicifolia	133593	62	Picea nigra	109987
17	Quercus lyrata	133438	63	Sideroxylon Mastichodendron	109948
18	Betula papyrifera	130557	64	Ulmus racemosa	109628
19	Robinia Pseudacacia	129238	65	Juglans nigra	109200
20	Pseudotsuga Douglasii	128297	66	Gleditschia triacanthos	108579
21	Abies nobilis	127660	67	Amyris sylvatica	108507
22	Salix flavescens, var. Scouleriana	126216	68	Acacia Greggii	108507
23	Larix Americana	126126	69	Eugenia monticola	108507
24	Abies amabilis	126013	70	Quercus coccinea	108507
25	Quercus laurifolia	125916	71	Alnus incana	108507
26	Citharexylum villosum	125717	72	Salix flavescens	108507
27	Quercus Prinus	125473	73	Fraxinus Americana, var. Texensis	108174
28	Osmanthus Americanus	123133			
29	Quercus aquatica	122657	74	Cupressus macrocarpa	107327
30	Quercus heterophylla	122494	75	Umbellularia Californica	106766
31	Chamæcyparis Lawsoniana	121772	76	Swietenia Mahogoni	106272
32	Fagus ferruginea	120996	77	Alnus rubra	106046
33	Quercus chrysolepis	119810	78	Populus Fremontii	105116
34	Amelanchier Canadensis	119677	79	Pseudotsuga Douglasii, var. macrocarpa	105007
35	Exostema Caribæum	119357			
36	Quercus imbricaria	119357	80	Rhus Metopium	105007
37	Pinus muricata	119357	81	Reynosia latifolia	105005
38	Eugenia procera	119111	82	Gymnocladus Canadensis	104822
39	Gleditschia monosperma	116991	83	Drypetes crocea	103890
40	Pinus serotina	116957	84	Carya sulcata	103884
41	Magnolia macrophylla	116854	85	Quercus Catesbæi	103468
42	Carya tomentosa	114995	86	Quercus tinctoria	103427
43	Robinia Neo-Mexicana	114889	87	Thuya gigantea	103372
44	Carpinus Caroliniana	114881	88	Quercus rubra, var. Texana	103343
45	Condalia ferrea	114316	89	Carya porcina	103300
46	Pinus Coulteri	114108	90	Taxodium distichum	103206

Relative Order.	Species.	Coefficient of Elasticity.
91	Cornus Nuttallii	103081
92	Carya amara	102986
93	Chamæcyparis Nutkaensis	102881
94	Acer saccharinum, var. nigrum	102726
95	Conocarpus erecta	102411
96	Picea alba	102280
97	Fraxinus Americana	101068
98	Carya aquatica	101261
99	Castanopsis chrysophylla	101195
100	Mimusops Sieberi	100226
101	Cladrastis tinctoria	100226
102	Bourreria Havanensis	99649
103	Populus monilifera	99417
104	Myrica Californica	99161
105	Picea Sitchensis	99001
106	Pinus insignis	97850
107	Sophora affinis	97694
108	Colubrina reclinata	97656
109	Quercus nigra	97656
110	Abies Fraseri	97170
111	Quercus alba	97089
112	Quercus Michauxii	96373
113	Quercus densiflora	96347
114	Populus grandidentata	96327
115	Abies grandis	95838
116	Quercus agrifolia	95276
117	Ulmus fulva	95274
118	Pinus monticola	95068
119	Negundo Californicum	94532
120	Magnolia Fraseri	94462
121	Quercus hypoleuca	94409
122	Maclura aurantiaca	94373
123	Acer rubrum	94284
124	Pinus Banksiana	94231
125	Magnolia cordata	94073
126	Prunus Caroliniana	93727
127	Simaruba glauca	93217
128	Quercus macrocarpa	92929
129	Magnolia acuminata	92817
130	Pinus Jeffreyi	92777
131	Liriodendron Tulipifera	92667
132	Betula occidentalis	92424
133	Magnolia glauca	91239
134	Pinus reflexa	91287
135	Rhamnus Purshiana	91268
136	Abies concolor	90889
137	Viburnum prunifolium	90654
138	Quercus bicolor	90636
139	Magnolia grandiflora	90330
140	Fraxinus viridis	90313
141	Cratægus subvillosa	90023
142	Tsuga Canadensis	89970
143	Oxydendrum arboreum	88851
144	Myrica cerifera	88778
145	Salix lasiolepis	88778
146	Pinus ponderosa	88731
147	Salix lasiandra, var. lancifolia	87935
148	Fraxinus sambucifolia	87185
149	Olneya Tesota	86822
150	Celtis occidentalis, var. reticulata	86805
151	Xanthoxylum Caribæum	86755
152	Platanus occidentalis	86402
153	Liquidambar Styraciflua	86388
154	Guaiacum sanctum	86324
155	Prunus emarginata, var. mollis	86055
156	Quercus Wislizeni	86055
157	Prunus serotina	85833
158	Quercus oblongifolia	85739
159	Populus balsamifera	85690
160	Castanea vulgaris, var. Americana	85621
161	Pinus Strobus	85093
162	Piscidia Erythrina	85079
163	Persea Carolinensis, var. palustris	84918
164	Fraxinus Oregana	84818
165	Libocedrus decurrens	84729
166	Tilia heterophylla	84659
167	Alnus rhombifolia	84580
168	Populus Fremontii, var. Wislizeni	84317
169	Tilia Americana	84010
170	Persea Carolinensis	83900
171	Arbutus Menziesii	83884
172	Quercus Durandii	83766
173	Sapindus marginatus	83681
174	Drypetes crocea, var. latifolia	83619
175	Quercus obtusiloba	83257
176	Torreya taxifolia	82833
177	Prunus Americana	82659
178	Prosopis pubescens	82424
179	Morus rubra	82377
180	Pinus Arizonica	82370
181	Catalpa speciosa	82156
182	Cornus florida	82112
183	Abies balsamea	81924
184	Nyssa sylvatica	81832
185	Populus tremuloides	81441
186	Andromeda ferruginea	81380
187	Juglans cinerea	81253
188	Fraxinus pubescens	81222
189	Tilia Americana, var. pubescens	81111
190	Quercus Garryana	81109
191	Picea Engelmanni	80791
192	Pinus pungens	80330
193	Gordonia Lasianthus	79414
194	Pinus Lambertiana	79375
195	Cratægus arborescens	78837
196	Quercus Phellos	78440
197	Cliftonia ligustrina	78250
198	Diospyros Virginiana	78234
199	Bumelia lycioides	78125
200	Acer macrophyllum	78032
201	Tsuga Pattoniana	77524

Relative Order.	Species.	Coefficient of Elasticity.
202	Fraxinus quadrangulata	77439
203	Quercus Douglasii	77166
204	Pinus Murrayana	77113
205	Alnus oblongifolia	76937
206	Prunus demissa	76895
207	Abies subalpina	76199
208	Taxus brevifolia	76133
209	Bumelia tenax	75120
210	Quercus cinerea	75120
211	Ulmus Americana	74742
212	Quercus Kelloggii	74488
213	Magnolia Umbrella	74305
214	Rhamnus Caroliniana	74084
215	Quercus grisea	73982
216	Rhus copallina	73647
217	Juniperus occidentalis, var. conjugens	73426
218	Prunus ilicifolia	73201
219	Cratægus tomentosa	73160
220	Populus balsamifera, var. candicans	73024
221	Betula alba, var. populifolia	72970
222	Juglans rupestris	72632
223	Xanthoxylum Clava-Herculis	72577
224	Pinus Chihuahuana	72575
225	Laguncularia racemosa	72396
226	Populus heterophylla	72338
227	Acer circinatum	71810
228	Quercus lobata	71664
229	Pinus Balfouriana, var. aristata	71482
230	Tsuga Caroliniana	71282
231	Cratægus flava, var. pubescens	70765
232	Ulmus crassifolia	70399
233	Forestiera acuminata	70282
234	Cercis Canadensis	68798
235	Celtis occidentalis	68527
236	Halesia diptera	68321
237	Pinckneya pubens	68291
238	Æsculus Californica	68216
239	Catalpa bignonioides	68161
240	Nyssa capitata	68083
241	Sequoia sempervirens	67646
242	Pinus flexilis	67531
243	Cratægus spathulata	67349
244	Juniperus Virginiana	66992
245	Carya oliviæformis	66646
246	Cratægus Crus-galli	66436
247	Abies magnifica	66220
248	Rhododendron maximum	64578
249	Æsculus glabra	64438
250	Ilex opaca	64317
251	Pyrus coronaria	64241
252	Ilex Dahoon	64192
253	Quercus Emoryi	63828
254	Pyrus sambucifolia	62600
255	Platanus racemosa	62401
256	Symplocos tinctoria	62202
257	Arbutus Xalapensis	61577
258	Juniperus pachyphlœa	61275
259	Prunus angustifolia	60281
260	Bumelia cuneata	60281
261	Fraxinus pistaciæfolia	60119
262	Pinus Balfouriana	59386
263	Cratægus æstivalis	59185
264	Pinus Sabiniana	58517
265	Kalmia latifolia	58484
266	Prosopis juliflora	58297
267	Negundo aceroides	58156
268	Pinus rigida	58127
269	Quercus undulata, var. Gambellii	57162
270	Washingtonia filifera	56346
271	Parkinsonia Torreyana	55839
272	Picea pungens	55360
273	Planera aquatica	55167
274	Chilopsis saligna	54421
275	Pinus clausa	54295
276	Pinus inops	54295
277	Pinus Torreyana	54218
278	Thuya occidentalis	53311
279	Byrsonima lucida	52503
280	Ulmus alata	52323
281	Sassafras officinale	51910
282	Nyssa uniflora	51678
283	Salix amygdaloides	50144
284	Anona laurifolia	50113
285	Cupressus Goveniana	49941
286	Cyrilla racemiflora	48828
287	Salix lævigata	48828
288	Bumelia lanuginosa	48334
289	Asimina triloba	48179
290	Fraxinus platycarpa	47637
291	Pisonia obtusata	45503
292	Lysiloma latisiliqua	46064
293	Populus angustifolia	45847
294	Platanus Wrightii	45644
295	Sequoia gigantea	45146
296	Pinus glabra	44750
297	Pinus monophylla	43488
298	Pinus tuberculata	42870
299	Pinus edulis	42094
300	Bursera gummifera	41694
301	Ficus pedunculata	40690
302	Chamæcyparis sphæroidea	40410
303	Torreya Californica	40146
304	Ehretia elliptica	39697
305	Salix nigra	39062
306	Pinus albicaulis	38147
307	Pinus Parryana	37788
308	Sambucus glauca	30517
309	Salix lasiandra, var. Fendleriana	30517
310	Ficus aurea	25699

TABLE V.

The Principal Trees of the United States arranged in the Order of the Strength of their Woods (Modulus of Rupture, — Kilogram, Centimetre).

Relative Order.	Species.	Modulus of Rupture	Relative Order.	Species.	Modulus of Rupture.
1	Carya myristicæformis	1394	45	Cupressus macrocarpa	1045
2	Amyris sylvatica	1305	46	Quercus nigra	1043
3	Robinia Pseudacacia	1273	47	Quercus tinctoria	1041
4	Quercus chrysolepis	1268	48	Pinus mitis	1038
5	Betula lutea	1248	49	Myrica Californica	1036
6	Quercus prinoides	1238	50	Quercus Prinus	1031
7	Larix occidentalis	1227	51	Pinus muricata	1031
8	Quercus imbricaria	1218	52	Gleditschia monosperma	1027
9	Colubrina reclinata	1216	53	Canella alba	1026
10	Betula lenta	1216	54	Quercus lyrata	1025
11	Rhizophora Mangle	1207	55	Quercus rubra, var. Texana	1024
12	Carya alba	1200	56	Acer dasycarpum	1019
13	Quercus falcata	1193	57	Quercus virens	1017
14	Hypelate paniculata	1190	58	Exostema Caribæum	1005
15	Quercus laurifolia	1181	59	Swietenia Mahogoni	1003
16	Eugenia procera	1176	60	Quercus Douglasii	993
17	Eugenia monticola	1172	61	Quercus Durandii	993
18	Pinus Cubensis	1172	62	Quercus cinerea	993
19	Pinus serotina	1164	63	Pinus contorta	993
20	Pinus palustris	1152	64	Cornus Nuttallii	991
21	Acer saccharinum	1149	65	Castanea pumila	991
22	Carpinus Caroliniana	1149	66	Quercus rubra	989
23	Diphollis salicifolia	1148	67	Quercus Phellos	989
24	Fagus ferruginea	1148	68	Quercus macrocarpa	982
25	Ostrya Virginica	1134	69	Betula nigra	972
26	Amelanchier Canadensis	1132	70	Sideroxylon Mastichodendron	970
27	Maclura aurantiaca	1131	71	Acer saccharinum, var. nigrum	962
28	Carya tomentosa	1129	72	Chrysobalanus Icaco	961
29	Fraxinus Americana, var. Texensis	1125	73	Viburnum prunifolium	951
30	Quercus Michauxii	1118	74	Quercus densiflora	946
31	Quercus hypoleuca	1113	75	Bourreria Havanensis	944
32	Carya amara	1101	76	Conocarpus erecta	942
33	Quercus palustris	1090	77	Citharexylum villosum	937
34	Carya sulcata	1083	78	Quercus grisea	937
35	Taxus brevifolia	1078	79	Quercus agrifolia	935
36	Quercus heterophylla	1073	80	Prunus Caroliniana	928
37	Ulmus racemosa	1066	81	Gleditschia triacanthos	923
38	Betula papyrifera	1065	82	Mimusops Sieberi	914
39	Eugenia buxifolia	1055	83	Coccoloba Floridana	918
40	Quercus coccinea	1054	84	Robinia Neo-Mexicana	909
41	Quercus aquatica	1052	85	Quercus bicolor	909
42	Osmanthus Americanus	1051	86	Salix flavescens, var. Scouleriana	909
43	Quercus Catesbæi	1046	87	Tsuga Mertensiana	909
44	Carya porcina	1046	88	Arbutus Menziesii	907

Relative Order.	Species.	Modulus of Rupture.	Relative Order.	Species.	Modulus of Rupture.
89	Quercus alba	905	144	Prunus ilicifolia	782
90	Condalia ferrea	904	145	Pinus Sabiniana	779
91	Cornus florida	904	146	Betula alba, var. populifolia	778
92	Cladrastis tinctoria	902	147	Morus rubra	775
93	Persea Carolinensis	902	148	Ulmus crassifolia	773
94	Larix Americana	901	149	Gymnocladus Canadensis	771
95	Fraxinus viridis	895	150	Populus monilifera	770
96	Prosopis pubescens	894	151	Pinus reflexa	770
97	Chamæcyparis Lawsoniana	888	152	Quercus Kelloggii	768
98	Torreya taxifolia	887	153	Acer circinatum	766
99	Carya aquatica	884	154	Juniperus pachyphlœa	761
100	Pinus Taeda	883	155	Pinus Coulteri	761
101	Pseudotsuga Douglasii	881	156	Pinus Torreyana	756
102	Diospyros Virginiana	879	157	Xanthoxylum Caribæum	754
103	Quercus Garryana	879	158	Piscidia Erythrina	752
104	Quercus obtusiloba	872	159	Rhamnus Purshiana	750
105	Fraxinus pubescens	869	160	Olneya Tesota	750
106	Ulmus fulva	869	161	Thuya gigantea	749
107	Prunus Americana	864	162	Picea nigra	747
108	Quercus lobata	861	163	Picea alba	747
109	Abies nobilis	862	164	Pinus Jeffreyi	744
110	Fraxinus Americana	861	165	Castanopsis chrysophylla	741
111	Chrysophyllum oliviforme	857	166	Juniperus Virginiana	740
112	Halesia diptera	857	167	Pinus insignis	740
113	Juglans nigra	856	168	Pinus rigida	739
114	Ulmus Americana	852	169	Cratægus subvillosa	738
115	Pseudotsuga Douglasii, var. macrocarpa	846	170	Magnolia glauca	736
			171	Tsuga Canadensis	736
116	Sapindus marginatus	843	172	Oxydendrum arboreum	728
117	Pinus Chihuahuana	832	173	Cercis Canadensis	726
118	Nyssa sylvatica	830	174	Pinus pungens	726
119	Prunus serotina	829	175	Cratægus flava, var. pubescens	724
120	Reynosia latifolia	820	176	Ulmus alata	724
121	Persea Carolinensis, var. palustris	820	177	Ehretia elliptica	721
122	Alnus incana	820	178	Populus grandidentata	721
123	Quercus Wislizeni	818	179	Pinus ponderosa	720
124	Myrica cerifera	815	180	Quercus oblongifolia	719
125	Salix lasiolepis	813	181	Tsuga Pattoniana	719
126	Acer rubrum	811	182	Forestiera acuminata	717
127	Sophora affinis	811	183	Cratægus æstivalis	712
128	Fraxinus quadrangulata	811	184	Cratægus tomentosa	709
129	Alnus rubra	811	185	Magnolia Fraseri	707
130	Salix flavescens	808	186	Drypetes crocea, var. latifolia	707
131	Fraxinus sambucifolia	806	187	Abies concolor	703
132	Umbellularia Californica	806	188	Quercus Emoryi	703
133	Betula occidentalis	806	189	Abies magnifica	701
134	Celtis occidentalis, var. reticulata	805	190	Populus Fremontii	698
135	Chamæcyparis Nutkaensis	801	191	Magnolia macrophylla	696
136	Pinus resinosa	800	192	Castanea vulgaris, var. Americana	696
137	Negundo Californicum	796	193	Prunus demissa	691
138	Drypetes crocea	796	194	Populus Fremontii, var. Wislizeni	691
139	Magnolia grandiflora	792	195	Ilex opaca	686
140	Acacia Greggii	792	196	Alnus oblongifolia	686
141	Abies amabilis	792	197	Acer macrophyllum	684
142	Celtis occidentalis	789	198	Nyssa capitata	682
143	Guaiacum sanctum	787	199	Alnus rhombifolia	682

Relative Order.	Species.	Modulus of Rupture.
200	Libocedrus decurrens	682
201	Taxodium distichum	682
202	Quercus undulata, var. Gambellii	680
203	Prunus emarginata, var. mollis	679
204	Andromeda ferruginea	679
205	Populus tremuloides	677
206	Salix lasiandra, var. lancifolia	675
207	Bumelia tenax	673
208	Magnolia acuminata	671
209	Gordonia Lasianthus	670
210	Fraxinus Oregana	665
211	Populus trichocarpa	665
212	Rhus copallina	663
213	Rhododendron maximum	663
214	Pinus inops	658
215	Liriodendron Tulipifera	657
216	Rhus Metopium	656
217	Nyssa uniflora	655
218	Cratægus Crus-galli	653
219	Pinus Balfouriana, var. aristata	653
220	Pinus Arizonica	653
221	Pinus Banksiana	652
222	Liquidambar Styraciflua	651
223	Picea Sitchensis	649
224	Salix lævigata	644
225	Populus heterophylla	642
226	Xanthoxylum Clava-Herculis	640
227	Kalmia latifolia	639
228	Abies Fraseri	639
229	Æsculus Californica	635
230	Catalpa speciosa	635
231	Platanus occidentalis	635
232	Pinus Strobus	626
233	Pinus flexilis	624
234	Fraxinus pistaciæfolia	622
235	Cratægus arborescens	621
236	Planera aquatica	621
237	Symplocos tinctoria	619
238	Arbutus Xalupensis	618
239	Pinus monticola	609
240	Populus balsamifera, var. candicans	609
241	Anona laurifolia	607
242	Sassafras officinale	602
243	Magnolia cordata	600
244	Juglans rupestris	600
245	Juglans cinerea	597
246	Sequoia sempervirens	597
247	Pinus Lambertiana	597
248	Catalpa bignonioides	590
249	Tilia Americana	589
250	Magnolia Umbrella	583
251	Torreya Californica	583
252	Pinus albicaulis	581
253	Chilopsis saligna	578
254	Carya oliviæformis	578
255	Tilia heterophylla	577
256	Picea Engelmanni	574
257	Ilex Dahoon	572
258	Rhamnus Caroliniana	567
259	Simaruba glauca	565
260	Pinus Murrayana	564
261	Bumelia lycioides	562
262	Platanus racemosa	562
263	Tilia Americana, var. pubescens	560
264	Lysiloma latisiliqua	553
265	Salix amygdaloides	550
266	Populus balsamifera	550
267	Parkinsonia Torreyana	546
268	Cupressus Goveniana	539
269	Fraxinus platycarpa	536
270	Negundo aceroides	529
271	Cliftonia ligustrina	526
272	Laguncularia racemosa	518
273	Bumelia cuneata	515
274	Abies balsamea	515
275	Thuya occidentalis	512
276	Cratægus spathulata	506
277	Pinus clausa	502
278	Pinus glabra	496
279	Æsculus glabra	494
280	Abies grandis	494
281	Prosopis juliflora	485
282	Pyrus coronaria	485
283	Abies subalpina	473
284	Salix lasiandra, var. Fendleriana	469
285	Prunus angustifolia	468
286	Juniperus occidentalis, var. conjugens	468
287	Tsuga Caroliniana	461
288	Sequoia gigantea	459
289	Chamæcyparis sphæroidea	456
290	Picea pungens	454
291	Pinus edulis	447
292	Pyrus sambucifolia	445
293	Washingtonia filifera	429
294	Platanus Wrightii	428
295	Pinus Parryana	426
296	Byrsonima lucida	424
297	Salix nigra	424
298	Pinus Balfouriana	424
299	Pinus tuberculata	409
300	Pinckneya pubens	405
301	Populus angustifolia	400
302	Asimina triloba	391
303	Bumelia lanuginosa	387
304	Sambucus glauca	370
305	Cyrilla racemiflora	314
306	Pisonia obtusata	297
307	Pinus monophylla	288
308	Ficus aurea	239
309	Ficus pedunculata	230
310	Bursera gummifera	148

TABLE VI.

The Principal Trees of the United States arranged in the Order of the Power of their Woods to resist Longitudinal Compression.

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
1	Eugenia buxifolia	887	39	Carya tomentosa	593
2	Rhizophora Mangle	860	40	Viburnum prunifolium	592
3	Reynosia latifolia	839	41	Ulmus racemosa	592
4	Maclura aurantiaca	809	42	Prosopis juliflora	588
5	Condalia ferrea	803	43	Prunus Americana	588
6	Canella alba	782	44	Gleditschia monosperma	584
7	Coccoloba Floridana	771	45	Juglans nigra	583
8	Exostema Caribæum	751	46	Quercus rubra, var. Texana	582
9	Amyris sylvatica	748	47	Carya porcina	577
10	Acacia Greggii	743	48	Bourreria Havanensis	575
11	Guaiacum sanctum	737	49	Quercus prinoides	575
12	Dipholis salicifolia	730	50	Persea Carolinensis	573
13	Robinia Pseudacacia	694	51	Sophora affinis	570
14	Citharexylum villosum	689	52	Umbellularia Californica	568
15	Larix occidentalis	689	53	Prunus Caroliniana	562
16	Xanthoxylum Caribæum	685	54	Carya sulcata	559
17	Robinia Neo-Mexicana	683	55	Quercus Douglasii	557
18	Eugenia procera	672	56	Viburnum Lentago	555
19	Prosopis pubescens	671	57	Pinus contorta	554
20	Amelanchier Canadensis	670	58	Eugenia monticola	553
21	Hypelate paniculata	666	59	Quercus imbricaria	552
22	Swietenia Mahogoni	666	60	Acer saccharinum, var. nigrum	550
23	Pinus Cubensis	664	61	Prunus serotina	547
24	Cornus Nuttallii	663	62	Osmanthus Americanus	547
25	Cercocarpus ledifolius	655	63	Quercus virens	547
26	Sideroxylon Mastichodendron	650	64	Tsuga Mertensiana	547
27	Drypetes crocea	650	65	Quercus chrysolepis	545
28	Carya myristicæformis	638	66	Prunus ilicifolia	544
29	Pinus palustris	629	67	Ostrya Virginica	542
30	Carya alba	625	68	Fraxinus Americana, var. Texensis	541
31	Rhamnus Purshiana	621	69	Ulmus fulva	539
32	Acer saccharinum	619	70	Prunus Capuli	538
33	Betula lutea	619	71	Crataegus subvillosa	538
34	Betula lenta	619	72	Quercus Prinus	538
35	Conocarpus erecta	599	73	Larix Americana	536
36	Chrysophyllum oliviforme	598	74	Cladrastis tinctoria	534
37	Piscidia Erythrina	597	75	Cornus florida	534
38	Quercus falcata	596	76	Quercus Durandii	534

Relative Order.	Species.	Crushing Weight.
77	Rhus Metopium	533
78	Quercus Wislizenii	533
79	Myrica Californica	532
80	Juniperus occidentalis, var. conjugens	532
81	Cratægus flava, var. pubescens	527
82	Quercus laurifolia	526
83	Carya amara	522
84	Fraxinus Oregana	520
85	Drypetes crocea, var. latifolia	520
86	Pseudotsuga Douglasii	519
87	Quercus alba	511
88	Quercus rubra	511
89	Prunus demissa	510
90	Pinus muricata	500
91	Quercus Garryana	505
92	Pinus serotina	505
93	Quercus coccinea	504
94	Diospyros Virginiana	503
95	Arbutus Menziesii	502
96	Oxydendrum arboreum	501
97	Quercus tinctoria	501
98	Quercus aquatica	501
99	Gleditschia triacanthos	500
100	Fraxinus quadrangulata	499
101	Prunus umbellata	498
102	Cratægus arborescens	498
103	Carpinus Caroliniana	498
104	Quercus nigra	497
105	Castanea pumila	495
106	Quercus lyrata	492
107	Quercus macrocarpa	491
108	Quercus palustris	490
109	Quercus bicolor	490
110	Magnolia macrophylla	489
111	Bumelia lycioides	489
112	Pinus reflexa	489
113	Andromeda ferruginea	487
114	Quercus obtusiloba	487
115	Betula papyrifera	487
116	Carya aquatica	486
117	Taxus brevifolia	483
118	Magnolia grandiflora	482
119	Acer dasycarpum	482
120	Fraxinus viridis	482
121	Quercus Michauxii	482
122	Lysiloma latisiliqua	481
123	Rhus copallina, var. lanceolata	479
124	Quercus grisea	479
125	Bumelia cuneata	478
126	Fagus ferruginea	478
127	Pinus mitis	477
128	Quercus densiflora	475
129	Sapindus marginatus	470
130	Cercis Canadensis	469
131	Nyssa sylvatica	468
132	Salix flavescens, var. Scouleriana	468
133	Abies amabilis	467
134	Liquidambar Styraciflua	466
135	Chamæcyparis Lawsoniana	466
136	Acer rubrum	463
137	Fraxinus Americana	463
138	Quercus agrifolia	463
139	Pseudotsuga Douglasii, var. macrocarpa	463
140	Prunus emarginata, var. mollis	460
141	Mimusops Sieberi	460
142	Torreya taxifolia	460
143	Acer circinatum	459
144	Quercus Catesbæi	457
145	Cratægus spathulata	455
146	Chamæcyparis Nutkaensis	455
147	Pinus resinosa	455
148	Ulmus crassifolia	453
149	Abies nobilis	453
150	Bumelia tenax	452
151	Platanus occidentalis	450
152	Thuya gigantea	450
153	Xanthoxylum Clava-Herculis	449
154	Laguncularia racemosa	449
155	Ulmus alata	449
156	Quercus Kelloggii	449
157	Quercus cinerea	448
158	Ulmus Americana	446
159	Cratægus tomentosa	445
160	Cratægus æstivalis	445
161	Myrica cerifera	445
162	Rhamnus Caroliniana	444
163	Negundo Californicum	442
164	Hypelate trifoliata	439
165	Rhododendron maximum	439
166	Betula nigra	438
167	Juglans rupestris	437
168	Celtis occidentalis, var. reticulata	437
169	Fraxinus pubescens	435
170	Castanopsis chrysophylla	435
171	Abies magnifica	435
172	Halesia diptera	434
173	Carya oliviæformis	434
174	Quercus oblongifolia	434
175	Nyssa capitata	431
176	Cratægus Crus-galli	430
177	Kalmia latifolia	430
178	Salix Hookeriana	427
179	Pinus Tæda	427
180	Simaruba glauca	426
181	Magnolia glauca	424
182	Quercus lobata	424
183	Fraxinus sambucifolia	423
184	Taxodium distichum	423
185	Quercus Emoryi	422

Relative Order.	Species.	Crushing Weight.
186	Celtis occidentalis	421
187	Morus rubra	420
188	Ilex opaca	419
189	Pyrus coronaria	419
190	Magnolia Fraseri	418
191	Parkinsonia Torreyana	417
192	Quercus undulata, var. Gambellii	417
193	Pinus Jeffreyi	417
194	Pinus insignis	417
195	Juniperus Virginiana	416
196	Sequoia sempervirens	416
197	Magnolia acuminata	415
198	Alnus rubra	415
199	Quercus heterophylla	412
200	Magnolia cordata	410
201	Salix flavescens	408
202	Prunus Pennsylvanica	407
203	Catalpa speciosa	407
204	Picea nigra	407
205	Tilia Americana, var. pubescens	405
206	Libocedrus decurrens	403
207	Tsuga Caroliniana	403
208	Prunus angustifolia	402
209	Arbutus Xalapensis	401
210	Forestiera acuminata	401
211	Gymnocladus Canadensis	400
212	Vaccinium arboreum	399
213	Pinus Banksiana	396
214	Tilia heterophylla	394
215	Ungnadia speciosa	394
216	Planera aquatica	394
217	Juglans cinerea	392
218	Byrsonima lucida	391
219	Betula occidentalis	391
220	Abies grandis	391
221	Quercus Phellos	390
222	Populus trichocarpa	390
223	Abies concolor	390
224	Sequoia gigantea	388
225	Gordonia Lasianthus	387
226	Ehretia elliptica	387
227	Fraxinus pistaciæfolia	385
228	Salix lasiolepis	385
229	Symplocos tinctoria	384
230	Tsuga Canadensis	384
231	Pyrus sambucifolia	383
232	Sassafras officinale	382
233	Acer macrophyllum	381
234	Castanea vulgaris, var. Americana	381
235	Pinus Arizonica	381
236	Pinus ponderosa	381
237	Pyrus Americana	380
238	Tsuga Pattoniana	379
239	Populus Fremontii	378
240	Rhus copallina	377
241	Pinus clausa	377
242	Liriodendron Tulipifera	372
243	Populus Fremontii, var. Wislizeni	372
244	Cliftonia ligustrina	371
245	Persea Carolinensis, var. palustris	367
246	Pinus Coulteri	367
247	Magnolia Umbrella	366
248	Olneya Tesota	366
249	Nyssa uniflora	365
250	Abies balsamea	365
251	Catalpa bignonioides	364
252	Bumelia lanuginosa	362
253	Pinus inops	360
254	Cupressus Goveniana	359
255	Populus grandidentata	358
256	Alnus rhombifolia	356
257	Æsculus Californica	355
258	Pinus rigida	355
259	Pinus pungens	354
260	Populus monilifera	353
261	Picea Sitchensis	353
262	Torreya Californica	351
263	Ilex Dahoon	349
264	Pinus flexilis	349
265	Pinus edulis	349
266	Tilia Americana	348
267	Betula alba, var. populifolia	348
268	Abies Fraseri	347
269	Picea alba	342
270	Salix lasiandra, var. lancifolia	341
271	Pinus Strobus	339
272	Pinus Parryana	339
273	Pinus Balfouriana	337
274	Pinus Chihuahuana	337
275	Pinus Sabiniana	337
276	Pinus Lambertiana	336
277	Pinus monticola	334
278	Pinus Murrayana	333
279	Pinus albicaulis	331
280	Populus tremuloides	330
281	Platanus Wrightii	327
282	Pinus Balfouriana, var. aristata	325
283	Platanus racemosa	324
284	Negundo aceroides	322
285	Populus balsamifera	320
286	Salix lævigata	319
287	Æsculus glabra	313
288	Pisonia obtusata	310
289	Thuya occidentalis	306
290	Anona laurifolia	302
291	Abies subalpina	302
292	Chilopsis saligna	297
293	Quercus hypoleuca	293
294	Pinus Torreyana	290
295	Alnus incana	289

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
296	Pinus glabra	288	307	Salix amygdaloides	264
297	Salix lasiandra, var. Fendleriana	286	308	Pinus tuberculata	263
298	Populus heterophylla	283	309	Chamæcyparis sphæroidea	259
299	Ficus pedunculata	281	310	Picea pungens	258
300	Alnus oblongifolia	278	311	Coccoloba uvifera	258
301	Populus balsamifera, var. candicans	276	312	Fraxinus platycarpa	251
302	Sambucus glauca	275	313	Washingtonia filifera	227
303	Pinus monophylla	274	314	Salix nigra	213
304	Pinckneya pubens	272	315	Asimina triloba	212
305	Populus angustifolia	271	316	Ficus aurea	162
306	Picea Engelmanni	267	317	Bursera gummifera	155

TABLE VII.

The Principal Trees of the United States arranged in the Order of the Power of their Woods to resist Indentation to the Depth of 1.27 *Millimetres.*

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
1	Guaiacum sanctum	793	39	Swietenia Mahogoni	309
2	Olneya Tesota	655	40	Cithar exylum villosum	308
3	Condalia ferrea	649	41	Quercus Durandii	308
4	Reynosia latifolia	639	42	Prunus ilicifolia	305
5	Canella alba	573	43	Cornus florida	305
6	Amyris sylvatica	550	44	Carya porcina	301
7	Exostema Caribæum	481	45	Pinus serotina	296
8	Cercocarpus ledifolius	480	46	Bourreria Havanensis	294
9	Rhizophora Mangle	462	47	Quercus rubra, var. Texana	291
10	Eugenia procera	444	48	Carya sulcata	288
11	Quercus oblongifolia	439	49	Bumelia cuneata	286
12	Quercus Emoryi	415	50	Quercus nigra	286
13	Eugenia monticola	408	51	Juniperus occidentalis, var. conjugens	286
14	Drypetes crocea, var. latifolia	407			
15	Eugenia buxifolia	396	52	Amelanchier Canadensis	280
16	Coccoloba Floridana	394	53	Vaccinium arboreum	279
17	Hypelate trifoliata	384	54	Carya tomentosa	277
18	Chrysophyllum oliviforme	382	55	Gleditschia monosperma	276
19	Mimusops Sieberi	375	56	Quercus obtusiloba	276
20	Quercus Douglasii	374	57	Dipholis salicifolia	274
21	Xanthoxylum Caribæum	373	58	Carya aquatica	274
22	Conocarpus erecta	370	59	Celtis occidentalis, var. reticulata	273
23	Quercus grisea	364	60	Sapindus marginatus	272
24	Maclura aurantiaca	363	61	Prunus Capuli	272
25	Drypetes crocea	362	62	Quercus Wislizeni	272
26	Sideroxylon Mastichodendron	355	63	Quercus hypoleuca	272
27	Prosopis juliflora	343	64	Robinia Neo-Mexicana	271
28	Prunus umbellata	342	65	Carya alba	271
29	Piscidia Erythrina	337	66	Quercus prinoides	264
30	Sophora affinis	334	67	Taxus brevifolia	264
31	Prosopis pubescens	329	68	Crataegus subvillosa	263
32	Diospyros Virginiana	324	69	Kalmia latifolia	262
33	Quercus virens	324	70	Robinia Pseudacacia	258
34	Crataegus flava, var. pubescens	319	71	Acer saccharinum	257
35	Prunus Caroliniana	318	72	Ulmus crassifolia	255
36	Quercus chrysolepis	317	73	Ulmus alata	255
37	Carya myristicæformis	315	74	Quercus undulata, var. Gambellii	255
38	Viburnum prunifolium	313	75	Quercus laurifolia	253

Relative Order.	Species.	Crushing Weight.
76	Acer saccharinum, var. nigrum	252
77	Quercus lyrata	252
78	Pyrus coronaria	250
79	Arbutus Xalapensis	247
80	Osmanthus Americanus	247
81	Prunus demissa	246
82	Cornus Nuttallii	242
83	Carya amara	242
84	Cratægus tomentosa	240
85	Quercus Garryana	240
86	Cupressus macrocarpa	237
87	Quercus agrifolia	235
88	Quercus macrocarpa	233
89	Quercus Michauxii	233
90	Carya olivæformis	232
91	Ostrya Virginica	231
92	Quercus Prinus	230
93	Ehretia elliptica	229
94	Quercus Catesbæi	228
95	Parkinsonia Torreyana	226
96	Quercus imbricaria	226
97	Betula lenta	226
98	Andromeda ferruginea	225
99	Cratægus æstivalis	224
100	Quercus densiflora	224
101	Fraxinus quadrangulata	222
102	Chrysobalanus Icaco	221
103	Quercus bicolor	221
104	Bumelia lycioides	220
105	Fraxinus viridis	220
106	Cratægus spathulata	218
107	Celtis occidentalis	217
108	Quercus Phellos	216
109	Quercus alba	213
110	Carpinus Caroliniana	213
111	Prunus Americana	213
112	Pinus edulis	212
113	Byrsonima lucida	210
114	Cratægus Crus-galli	210
115	Fraxinus pistaciæfolia	210
116	Rhus Metopium	209
117	Arbutus Menziesii	207
118	Ulmus racemosa	205
119	Prunus serotina	204
120	Fraxinus pubescens	204
121	Quercus coccinea	202
122	Quercus tinctoria	202
123	Oxydendrum arboreum	201
124	Quercus falcata	201
125	Quercus cinerea	201
126	Acer circinatum	200
127	Persea Carolinensis	199
128	Umbellularia Californica	199
129	Fraxinus Americana, var. Texensis	198
130	Quercus aquatica	198
131	Magnolia grandiflora	197
132	Halesia diptera	197
133	Nyssa sylvatica	196
134	Juglans nigra	196
135	Fagus ferruginea	196
136	Pinus Parryana	195
137	Fraxinus sambucifolia	194
138	Rhamnus Purshiana	192
139	Persea Carolinensis, var. palustris	192
140	Rhododendron maximum	191
141	Quercus palustris	190
142	Myrica Californica	188
143	Quercus lobata	188
144	Juniperus occidentalis	186
145	Pinus Cubensis	186
146	Cratægus arborescens	184
147	Cladrastis tinctoria	183
148	Cercis Canadensis	182
149	Juglans rupestris	182
150	Quercus heterophylla	182
151	Acer dasycarpum	181
152	Bumelia tenax	181
153	Morus rubra	178
154	Cupressus Goveniana	178
155	Quercus rubra	177
156	Ilex opaca	176
157	Acer rubrum	176
158	Quercus Kelloggii	174
159	Lysiloma latisiliqua	171
160	Fraxinus Americana	171
161	Forestiera acuminata	170
162	Ulmus Americana	170
163	Pinus monophylla	169
164	Gleditschia triacanthos	168
165	Fraxinus Oregana	166
166	Platanus occidentalis	165
167	Acer macrophyllum	162
168	Nyssa uniflora	161
169	Betula lutea	161
170	Gymnocladus Canadensis	160
171	Bumelia lanuginosa	160
172	Xanthoxylum Clava-Herculis	159
173	Symplocos tinctoria	159
174	Torreya taxifolia	158
175	Pinus inops	156
176	Nyssa capitata	155
177	Pinus Chihuahuana	154
178	Pinus palustris	153
179	Ulmus fulva	150
180	Ungnadia speciosa	149
181	Laguncularia racemosa	149
182	Pinus contorta	149
183	Juniperus Virginiana	148
184	Cliftonia ligustrina	147
185	Pinus Balfouriana	147

Relative Order.	Species.	Crushing Weight.
186	Pinus Torreyana	147
187	Planera aquatica	146
188	Chilopsis saligna	144
189	Myrica cerifera	144
190	Salix lasiolepis	140
191	Larix occidentalis	139
192	Sambucus glauca	138
193	Fraxinus platycarpa	138
194	Pinus Sabiniana	138
195	Rhamnus Caroliniana	136
196	Sassafras officinale	134
197	Pinus Balfouriana, var. aristata	134
198	Prunus angustifolia	133
199	Pinus rigida	133
200	Liquidambar Styraciflua	132
201	Betula nigra	132
202	Pinus clausa	131
203	Betula alba, var. populifolia	129
204	Pinus mitis	129
205	Pinus reflexa	128
206	Anona laurifolia	127
207	Betula occidentalis	127
208	Rhus copallina, var. lanceolata	126
209	Betula papyrifera	126
210	Salix flavescens, var. Scouleriana	126
211	Tsuga Caroliniana	125
212	Magnolia Fraseri	123
213	Torreya Californica	122
214	Pinus muricata	122
215	Abies nobilis	120
216	Ficus pedunculata	119
217	Castanopsis chrysophylla	119
218	Castanea pumila	118
219	Salix lævigata	118
220	Pyrus Americana	117
221	Platanus Wrightii	117
222	Alnus rubra	117
223	Pinus Jeffreyi	116
224	Pinus pungens	115
225	Ilex Dahoon	113
226	Larix Americana	112
227	Negundo aceroides	111
228	Salix Hookeriana	111
229	Rhus copallina	109
230	Æsculus Californica	108
231	Pisonia obtusata	108
232	Pinus flexilis	108
233	Magnolia acuminata	107
234	Negundo Californicum	107
235	Pyrus sambucifolia	107
236	Pinus albicaulis	107
237	Pinus ponderosa	107
238	Pinus Tæda	107
239	Castanea vulgaris, var. Americana	106
240	Pinus glabra	106

Relative Order.	Species.	Crushing Weight.
241	Pinckneya pubens	105
242	Pinus Arizonica	105
243	Pinus insignis	105
244	Tsuga Pattoniana	104
245	Prunus Pennsylvanica	103
246	Magnolia glauca	102
247	Pseudotsuga Douglasii, var. macrocarpa	102
248	Chamæcyparis Nutkaensis	101
249	Tsuga Mertensiana	101
250	Pinus Banksiana	100
251	Populus Fremontii, var. Wislizeni	100
252	Pseudotsuga Douglasii	100
253	Gordonia Lasianthus	99
254	Salix flavescens	98
255	Libocedrus decurrens	98
256	Abies magnifica	96
257	Platanus racemosa	93
258	Salix nigra	93
259	Pinus Coulteri	92
260	Juglans cinerea	90
261	Magnolia cordata	89
262	Magnolia macrophylla	89
263	Salix lasiandra, var. lancifolia	87
264	Simaruba glauca	86
265	Catalpa speciosa	86
266	Populus Fremontii	86
267	Populus heterophylla	86
268	Pinus Murrayana	86
269	Pinus tuberculata	86
270	Pinus resinosa	85
271	Magnolia Umbrella	84
272	Populus monilifera	83
273	Liriodendron Tulipifera	82
274	Salix lasiandra, var. Fendleriana	82
275	Chamæcyparis Lawsoniana	82
276	Tsuga Canadensis	82
277	Salix amygdaloides	81
278	Taxodium distichum	81
279	Prunus emarginata, var. mollis	80
280	Populus tremuloides	80
281	Picea pungens	79
282	Alnus rhombifolia	78
283	Pinus Lambertiana	78
284	Abies concolor	78
285	Catalpa bignonioides	77
286	Picea nigra	77
287	Sequoia sempervirens	77
288	Populus angustifolia	76
289	Picea Engelmanni	76
290	Populus balsamifera	75
291	Abies balsamea	75
292	Alnus oblongifolia	74
293	Pinus Strobus	74
294	Picea alba	74

Relative Order.	Species.	Crushing Weight.
295	Picea Sitchensis	72
296	Æsculus glabra	71
297	Thuya gigantea	70
298	Asimina triloba	69
299	Tilia heterophylla	68
300	Sequoia gigantea	68
301	Chamæcyparis sphæroidea	67
302	Pinus monticola	67
303	Washingtonia filifera	66
304	Populus balsamifera, var. candicans	64
305	Abies subalpina	64
306	Abies amabilis	64
307	Tilia Americana	63
308	Populus trichocarpa	63
309	Populus grandidentata	62
310	Ficus aurea	61
311	Thuya occidentalis	60
312	Tilia Americana, var. pubescens	59
313	Abies grandis	51
314	Bursera gummifera	47

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